

1917

## Studies in the Agarics of Denmark<sup>1)</sup>.

Part III.

**Pluteus. Collybia. Inocybe.**

By

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With three plates.

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### THE GENUS PLUTEUS.

*Pluteus* is one of the best defined genera of the whole mushroom-family. While most other genera are rather heterogeneous, — being made up of different series or groups, some of which show so strong affinity to other genera that they might almost as well be removed to a neighbouring genus — a *Pluteus* is always a *Pluteus* and nothing else. — From *Volvaria*, with which it has most in common, the genus is clearly distinguished by its total want of a volva. And *Pluteolus* (the genus next in kind in the opposite direction) not only differs from *Pluteus* by the ochraceous and ellipsoid spores, but also by a totally different texture of the gills (want of inflated cystidia etc.).

*Pluteus* is a truly xylophilous genus. But while the larger species almost exclusively grow on rotten stumps and trunks, the smaller ones, such as *hispidulus*, *semihulbosus* etc., may also be found growing on the ground (but only where the soil is made up of leaf-mould, rotten twigs, peat or other decaying vegetable matter).

<sup>1)</sup> Part I of these Studies (General Introduction. The Genus *Mycena* was published in »Dansk Botanisk Arkiv« Vol. I no. 5 (1914), part II (*Amanita*, *Lepiota*, *Coprinus*) in vol. II no. 3 (1915).

»Danmarks Agaricaceer« now comprises about 900 watercolour-plates, all painted by the author. For further particulars see part I.

The number of *Plutei* found in Denmark is comparatively large. While FRIES (in »*Hymenomycetes Europæi*«) does not mention more than 15 species found in Sweden, the total number of Danish species is at least 18. But this is not to be wondered at, considering that the beech (*Fagus*) is the favorite host of most species, and Denmark is particularly rich in beechwoods. (Of course it must also be taken into consideration that a number of »new« species have been detected since the time of Fries).

Of these 18 Danish species only two (*cervinus* and *nanus*) are common, and most of the others are exceedingly rare or at least very sporadic. Two of the Danish species (*P. roseo-albus* and *P. leoninus*) I have never met with during 25 years of investigation (*P. roseo-albus* has not been seen here for more than a century!), and several others I have only found once or twice. What also causes no little difficulty to the study of the *Plutei* is their solitary occurrence: It is very rare to find a number of these fungi growing together and thus to get specimens in different stages of development for comparison and figuring. Thus *P. umbrosus* and *P. phlebophorus* are wanting in my collection, as the specimens found by me have not been in a stage fit for portraying.

Still I have succeeded in figuring some 14 species, besides some fairly distinct varieties (17 plates in all) or more than Fries himself had ever seen alive.

The Fries'ian idea: to divide the genus into groups according to the texture of the cuticle of the cap, I believe in the main the right one. But being confined to macroscopic investigation Fries was not able to draw the boundary-lines between the tribes with sufficient exactness. — FRIES, it will be remembered, arranged the species in three groups: the fibrillose, the atomate and the glabrous species. The microscopic examination however clearly shows that there are in fact only two main types: a) the species in which the cuticle is of fibrillose texture and b) those in which it is granulose, being made up of subglobular, inflated cells.

In the first group, which I shall term *Tricholomatae*, the cap varies from almost smooth and silky (*P. pellitus*) to very rough, pilose or squamulose (extreme forms of *P. cervinus*). In the other group, *Micaceae*, the cap is sometimes covered with glittering »meal« (*P. semibulbosus*), while in other cases it is smooth

and naked, as the globose cells do not fall apart but from a thin homogeneous cuticle (*P. chrysophæus* etc.). The fibrillose or cellular texture of the epiderm can be ascertained by means of a good pocket-lens, as the reflection from the globose cells gives to the latter type a micaceous hue. — A transition from one type to the other is formed by those species in which the terminal cells of the fibrils are inflated (clubshaped or almost ovate). Such species (f. inst. *P. plautus*) appear to the naked eye as having a somewhat velvety bloom on the surface of the cap.

The spores are of smaller value for systematic purposes their outline and size varying but little (from almost spheric to broadly oval). In the subglobose spore the proportion of the long and the short diameter is about 4:3 or 5:4; in the oval about 3:2.

But the cystidia are very characteristic in this genus. In all the species examined cystidia have been found, and they are generally large and inflated. But while in most cases the edge of the gills is densely set with rather plain-looking, obtuse, inflated-clubshaped or subfusoid cystidia, the sides of the gills are in some cases adorned with ventricose, somewhat bottle-shaped cystidia, crowned with 2—5 hook- or thornlike excrescences. In other species the inflated cystidia have a shorter or longer hairlike appendix. Numerous investigations have convinced me that the shape of the cystidia is a constant character and consequently of great systematic value, as it is of a much more precise nature than colour-shades and the like characteristics, on which one hitherto chiefly had to rely for singling out the different species. Thus f. inst. *P. salicinus* and the rather similar *P. cinereo-fuscus* can at once be distinguished in this way.

Making use of the microscopic characters for delining the main divisions of the genus a Key can be constructed that will serve as a comparatively easy means to the identification of any species met.

## KEY

TO THE SPECIES OF THE GENUS *PLUTEUS* FIGURED IN

»DANMARKS AGARICACEER«.

- A. **Tricholomatæ**. Cuticle smooth or pilose-squamulose, made up of filaments.
- α. **Coronatæ**. Cystidia (on sides of gills) crowned with 2—5 hooks or corniculate excrescences. Spores broadly oval.
- a. Cap soot-brown or gray.
1. Cap paler or darker soot-brown, large (6—10 cm) . . . *P. cervinus* (1)
  2. Cap glaucous-gray, smaller (4—5 cm) . . . . . *P. salicinus* (2)
- b. Cap whitish.
1. Cap very large and fleshy (8—15 cm broad) . . . . . *P. petasatus* (3)
  2. Cap smaller (5—7 cm) . . . . . *P. pellitus* (4)
- β. **Depauperatæ**. No hooked cystidia. Spores subglobose.
- a. Cap whitish, set with small, dark squamules.
1. Cap 2—4 cm, slightly squamulose.  
\* Cap becoming minutely squamulose all over, squamules dirt-brownish . . . . . *P. gracilis* (5)  
\* Cap slightly pilose-squamulose in the middle . . . *P. Roberti* (6)
  2. Cap 1 cm, everywhere densely clad with fuscous, pilose squamules. . . . . *P. hispidulus* (7)
- b. Cap dark umber or gray, velvety pruinose.
1. Cap dark umber, velvety. Cystidia without hairlike appendix.  
\* Edge of gills not dark . . . . . *P. plantus* (8)  
\* Edge of gills fuscous . . . . . *P. umbrosus* (9)
  2. Cap gray, with a powdery bloom. Cystidia often with a hairlike appendix . . . . . *P. cinereus* (10)
- B. **Micaceæ**. Cuticle smooth or somewhat mealy, formed of sub-globular cells. Spores almost spherical.
- α. Cap white, surface micaceous-mealy . . . . . *P. semibulbosus* (11)
- β. Cap coloured, pruinose or almost naked.
- a. Margin translucently striate. Cap small (2—3½), pale gray . . . . . *P. Godeyi* var. (12)
- b. Margin not striate.
1. Cap cinereous, rather large (3—4½ cm) . . . . . *P. cinereo-fuscus* (13)
  1. Cap soot-brown or yellowish.  
\* Cap soot-brown.  
† Stem white . . . . . *P. nanus* (14)  
†† Stem (and young gills) flushed with lemon-yellow . . . . . *P. n. var. lutescens*  
\* Cap yellowish-cinnamon . . . . . *P. chrysophæus* (15)



## SYSTEMATIC AND FLORISTIC NOTES.

## A. TRICHOLOMATÆ.

## α. CORONATÆ.

1. *P. cervinus* (Schaeff.).

Spores broadly oval (or subrotund-ovate), generally  $7-7\frac{1}{2} \times 5-5\frac{1}{2} \mu$ . Cystidia on edge of gills: inflated, obtuse or somewhat pointed,  $20-25 \mu$  broad; on the sides: bottleshaped fusoid, about  $15-16 \mu$  broad, apex with 3—4 hooks

Figured specimens: Hjallesø, on stump of *Fagus*, Oct. 1895. — Common, but solitary, especially on rotten stumps of *Fagus*, but also to be met with in coniferous woods.

This is (a rather dark specimen of) the typical form of this species, in which the cap is almost smooth, the stem, especially downwards, clad with more or less fuscous fibrils (in small specimens almost entirely white). — But besides this common type I have met with several others. On a big heap of sawdust (at Ry, Jylland) I have found a very robust form which was very much like Cooke's figure of *P. eximius* (Saund. et Smith) except for the want of the miniate edge. — And in a hedge (Hjallesø) I have seen a large form (which might be called var. *scaber*) in which the stem was everywhere set with black woolly squamules à la *Boletus scaber*, but coarser.

*P. umbrosus* (Pers.) sensu Bresadola (*Fungi Tridentini* tab. 116) which is very closely related to *P. cervinus*, especially the last-named variety, I have never met. Its corniculate cystidia show that it belongs here and distinguish it from *P. umbrosus* (auct. div.), no. 9.]

2. *P. salicinus* (Pers.).

Spores broadly ovate,  $8 \times 5\frac{1}{2} \mu$ . Cystidia on edge: inflated clavate,  $16-18 \mu$  broad; on sides: fusoid-bottleshaped, with hooks. Basidia 4-spored. Filaments on umbo about  $12 \mu$  diam., formed of elongated cylindric cells with pale fuscous content.

Fig. specim.: Søbø Søgaard, in wood, on a rotten branch (of *Fagus*), Sept. 1913. Also found at Lammehave (1913) and on *Salix caprea* in wood near Kvarndrup, Sept. 1916.

Fairly typical. Chiefly distinguished from small specimens of *P. cervinus* by its glaucous-gray, in the middle slightly fuscous-squamulose cap. — *P. salicinus* in the sense of RICKEN does not belong here but to group β.

3. *P. petasatus* Fr

Spores broadly oval  $7\frac{1}{2}-9 \times 4\frac{1}{2}-5 \mu$ . (1914:  $7-7\frac{1}{2} \times 5$ ). Cystidia fusoid-bottleshaped,  $11-14 \mu$  broad, apex with some few

hooks. [The edge of the gills is sparingly set with obtuse, inflated cystidia. Filaments on umbo formed of about  $8-10\mu$  broad cells, which are sometimes slightly fuscous (1914)].

Fig. specim.: Korint, on big heap of sawdust, gregarious, sub-fasciculate; fig. B. specimens (from a very sunny place) with the cuticle scorched and broken up into dark, fuscous, broad scales, Oct. 1899. Also found near Gelsted, on heap of sawdust, Oct. 1914.

#### 4 a. *P. pellitus* (Pers.).

Spores broadly ovate,  $6-7 \times 4-5\mu$ . Cystidia on sides: sub-fusoid, with hooks, on edge: inflated obtuse.

Fig. specim.: Kirkeby, on stump of Fagus, Oct. 1909. Also found in similar locality at Skjoldemose (1900) and Korsør (Sept. 1902). It is not clearly distinguished from pale forms of *P. cervinus*.

#### 4 b. *P. pell.* var.

Spores subrotund-oval,  $7\frac{1}{2} \times 5\frac{1}{2}\mu$ . Cystidia as in type.

Fig. specim.: Fruens Bøge, on the ground under old beeches, solitary, Aug. 1914.

A slender form (cap  $4\frac{1}{2}$  cm, stem about 7 cm), the white cap everywhere sparingly clad with very minute, dark fibrils, which on the umbo become denser and form small, fibrillous, erect squamules. This variety forms a transition to *P. Roberti*. — *P. Roberti* in the sense of Ricken appears to be this form.

### β. DEPAUPERATÆ.

#### 5. *P. gracilis* Bres. (as a variety of *pellitus*).

Spores oval-globose,  $6\frac{1}{2}-7 \times 5\frac{1}{2}-6\mu$ . Cystidia on edge (occasionally also on sides of gills) inflated clubshaped or somewhat fusoid, about  $18\mu$  broad. Surface of cap formed of cylindric or somewhat inflated cells (about  $90 \times 16\mu$ ) which at last become somewhat brownish.

Fig. specim.: Aarslev, on old pollarded *Populus canadensis*, Oct. 1916.

The description given by BRESADOLA fits my plant very well. But to judge from the cystidia it cannot be retained as a variety of *P. pellitus*. — The other variety, *punctillifer* Quél. (mentioned in Saccardo Syll. V 668) appears to be almost identical, except for the uncommonly small spores.

#### 6 a. *P. Roberti* Fr.

Spores ovate-globose,  $6\frac{1}{2}-8 \times 5\frac{1}{2}-6\mu$ .

Fig. specimens: Fruens Bøge, solitary on rotten stump of Fagus, Oct. 1899.

6 b. **P. Roberti** var.

Spores almost globose,  $7-8 \times 6-7 \mu$ . Cystidia inflated cylindric-ellipsoid,  $14-19 \mu$  broad.

Fig. specim.: Fruens Bøge, on rotten twig in foliaceous wood. July 1900. Cap convex-campanulate, small (12 mm). This form is intermediate between *P. Roberti* and *P. hispidulus*.

(As I have not had the opportunity to examine this species for many years I am not quite certain about its absolute want of hooked cystidia. But to judge from its close affinity to *P. hispidulus* it is not likely to have any such). (Vide also no. 4 b.).

7. **P. hispidulus** Fr.

Spores almost globular,  $5\frac{1}{2}-7 \times 5-5\frac{3}{4} \mu$ . Cystidia inflated-club-shaped,  $13-16 \mu$  broad.

Fig. specim.: Killerup, foliaceous copsewood, solitary on the ground (moist leaf-mouldy soil), Sept. 1905.

This elegant little species is well characterized by the soot-black hairs which almost entirely cover the whitish cuticle. In the middle they form erect, pilose squamules, towards the edge adpressed, hairy fibrils.

8. **P. plautus** (Weinm.).

Spores oval-subglobose,  $7-8\frac{1}{2} \times 6-7 \mu$ . Cystidia on edge  $16-24 \mu$  broad, fusoid-ventricose, without hooks. The sides of the gills are very sparingly set with similar cystidia. The filaments on the surface of the cap are obtuse inflated cylindric,  $14-24 \mu$  broad, pale fuscous-brownish.

Fig. specim.: Hjallese, on rotten trunk of *Picea*, Oct. 1901 (and Aug. 1902). Also found in same locality Aug. 1913 (a paler, less strongly umbonate and smaller specimen).

9. **P. umbrosus** (Pers.).

Spores ovate-globose,  $5\frac{1}{2}-6 \times 4-5 \mu$ . Cystidia on edge fusoid-bladder-shaped,  $15-25 \mu$  broad; content yellowish-brown.

Not figured. Found at Hjallese, on rotten stump of *Populus* in outskirts of wood, Sept. 1897, and on stump of foliaceous tree, Trolleborg, Oct. 1900. — The cap was about 4 cm broad, the stem somewhat fuscous. This plant is very well described by Ricken (l. cit. p. 278). It seems to me very closely related to *P. plautus*, (almost like *P. umbrosus* (sensu Bresadola) to *P. cervinus*). But which of the two is the true *Ag. umbrosus* of Persoon I cannot decide (vide page 5).

10. **P. cinereus** Quéf.

Spores subglobose-ovate  $7 \times 5\frac{1}{4} \mu$ . Cystidia inflated, with or without a hairlike appendix of varying length. Cells from

surface of cap inflated and obtusely fusiform (varying from sub-cylindric to almost lemonshaped), about  $15-18\mu$  broad.

Fig. specim.: Hjallese, copsewood on boggy, peaty bottom, solitary, Sept. 1906. Also found on rotten stump of *Fagus*, »Fjellebro«, Sept. 1912, and on leaf-mould (rubbish-heap in shady place) Hjallese, Sept. 1915 and 16.

This little species is macroscopically well characterized by the gray stem, everywhere covered with white, furfuraceous down. The cap is often more expanded than in the figured specimen, always lacunose-rugose about the umbo.

(To this section also belongs *P. phlebophorus* (Dittm.), which has been met with in several localities (on stumps of *Fagus*) here in Denmark. When typical it is very characteristic, having the entire cap covered with raised lines or rather minute, wavy, irregularly anastomosing ridges, which radiate from the middle and almost reach the edge. These ridges are set with inflated-fusoid cystidia like the gills. — It is figured (very carefully) by DITTMANN in STURM's Deutschl. Flora, tab. 15.).

## B. MICACEÆ.

### 11. *P. semibulbosus* (Lasch).

Spores ovate-subglobose,  $6-7 \times 5-5\frac{1}{2}\mu$ . Basidia 4-spored. Cystidia obtuse, elongated-cylindric, very prominent, about  $13-14\mu$  broad, entire length  $75-115\mu$ . Cells on surface of cap ovate-subglobose or almost spheric,  $25-35\mu$  in diameter.

Fig. specim.: Hjallese, in wood of *Fagus* and *Populus*, on the ground, Oct. 1907.

This little species has the cap densely covered with micaceous »meal«. It is entirely white, campanulate-subglobose, and everywhere sulcato rugose.

### 12. *P. Godeyi* Gill. (?) var.

Spores subglobose-ovate,  $7\frac{1}{2} \times 6\mu$ . Cystidia subovate or inflated clubshaped,  $12-25\mu$  broad. (1901: spores subglobose,  $6\frac{1}{2}-8 \times 5\frac{1}{2}-6\frac{1}{2}\mu$ ; cystidia inflated fusiform).

Fig. specim.: Hunderup, drive in foliaceous wood, on the ground, Sept. 1909. The figured specimen is very small. At Vormark, 1901, on the ground under *Salices* and *Populus*, I have met with specimens of the normal size (cap  $3\frac{1}{2}$  cm). — The translucidly striate margin distinguishes this species from almost all others.

I have also met with a slender, small, almost white, slightly fuscous-powdered form (cap about 2 cm, stem 4 cm). This little mushroom may be regarded either as a pallid form of *P. Godeyi* or as a reduced albino-variety of no. 14.

13. **P. cinereo-fuscus** J. E. Lange. (*P. nanus* var. *major* Cooke).  
Plate III fig. 1.

Spores subglobose-oval,  $8-10 \times 6-7 \mu$ . Cystidia rather obtuse, inflated fusiform or ellipsoid, hyaline,  $12-13 \mu$  broad. Cells from surface of cap globular, subfuscous,  $35-50 \mu$  diam. — The cystidia on the sides of the gills similar to those on the edge (1914). 1916: Spores  $7\frac{1}{2}-8\frac{1}{2} \times 5\frac{1}{2}-6\frac{1}{4}$ ; cells on cap  $25-45 \mu$ .

Fig. specim.: Fruens Bøge, gregarious, on heap of leaf-mould Oct. 1897 (and 1898—1916). — Also found on leaf-mouldy ground, Hjallesø, Aug. 1912 and Aug. 1914.

This plant undoubtedly is identical with *P. nanus* forma *major* Cooke (Illustrations, plate 305 c), but is — I think — better conceived as a distinct species, differing from *P. nanus* not only by its larger size but also by the characteristic glauco-cinereous colour (almost like *P. salicinus*). I add a brief diagnosis:

*Pileo 3—5 cm lato, ex subcampanulato expanso, sub lente mica-ceo-pulverulento, glauco-cinereo (umbo subfuscus), sub-hygrophano, margine leviter rugoso-striato; stipite 6—8 cm  $\times$   $\frac{1}{2}$  cm, cavo, albo, nudo, sericeo-substriato; lamellis subconfertis, ex albo salmonco-subroseis. Spore et cyst. ut supr.*

14 a. **P. nanus** (Pers.).

Spores almost globose,  $7-7\frac{1}{2} \times 6-6\frac{1}{2} \mu$ . Cystidia cylindric-bladdershaped.

Fig. specim.: Hjallesø, on the ground in mixed copsewood, Sept. 1897, solitary. — Rather common, as well on the ground as on rotten stumps.

14 b. **P. nanus** var. *lutescens*.

Spores almost globose,  $6\frac{1}{2}-7 \times 5\frac{1}{2}-6 \mu$ . Cystidia cylindric-bladdershaped,  $11-25 \mu$  broad. — Cells on surface of cap globular,  $30-45 \mu$  diam. (1915).

Fig. specim.: Revninge, in the head of an old pollarded *Populus*, Oct. 1899. — Also Ollerup (on stump of *Populus*) and in other localities.

15. **P. chrysophæus** (Schaeff.).

Spores subglobose,  $6\frac{1}{2} \times 5\frac{1}{2} \mu$ . Cystidia obtusely fusiform, sub-ventricose, inflated. Cuticle formed of subglobose yellowish cells (about  $30 \mu$  diam.).

Fig. specim.: Hollufgaard, on *Fagus* and *Populus*, Sept. 1916.

Spores etc. of all the species are figured on plate I.

## THE GENUS COLLYBIA.

*Collybia* is a genus fairly well separated from the adjoining genera. From *Mycena* it is distinguished macroscopically by the generally rather flat cap with slightly incurved edge and microscopically by want of the cystidia characteristic to this latter genus. (In most *Collybias* the gills either have no cystidia at all or inconspicuous hairshaped ones). — Some neighbouring species of *Clitocybe* differ in having subdecurrent gills, while in *Collybia* they are generally adnexed. Still it appears to me not unlikely that it would be preferable to transfer to *Collybia* some of the *Clitocybe difformes* (Fries). Their gills are not truly decurrent and their stem is tough and elastic almost as the stem of a genuine *Collybia*. But as any deviation from the old established nomenclature and classification (if it be not a marked improvement) should be avoided, I leave them in *Clitocybe*.

Also some species of *Tricholoma* show strong affinity to *Collybia*. This is especially true of *T. melaleucum* and its allies. In fact *Agaricus stridulus* Fr. — which the author places in *Collybia* — evidently belongs to the *melaleucum*-tribe and should not be kept apart from it. To make as little derangement as possible I therefore shall transfer *Ag. stridulus* to *Tricholoma* and place it with its numerous relatives. To *Tricholoma* I also refer the ambiguous *Ag. leucophaeatus* Karst., which the author at different times has placed in *Collybia*, *Tricholoma* and *Lyophyllum*. Within the genus *Naucoria* the little tribe which might be called »*Pisciodoræ*« also shows a marked affinity to *Collybia*. These very intimately related species are now by most authors scattered about, in a very unsatisfactory way, in different genera (*Collybia*, *Nolanea*, *Naucoria*). From the genus *Nolanea*, as now understood, they are excluded by having smooth spores. But the



question remains whether it would be preferable to place them in *Collybia* or *Naucoria*. In all the species the spores are (sub micr.) hyaline, and in some of them the sporedust is white or at least pale cream-coloured (*Collybia mimica* Smith and other species). But as the most common representative of the genus, *Ag. Cucumis*, has somewhat ferrugineous or incarnate-tawny sporedust, and all of them have large conic-subulate cystidia, I dare not at present place them in *Collybia*. Probably the best plan will be to include them in *Naucoria* as a special tribe (*Collybiopsis* or *Pisciodoræ*).

My reasons for transferring *Armillaria mucida* to *Collybia* are stated in part II of these studies. I notice that RICKEN (Die Blätterpilze) has adopted the same view (which was, I believe, first propounded by QUÉLET (Flore mycologique)).

In another direction *Collybia* shows very strong affinity to *Marasmius*. In fact the line of demarcation is in several places very difficult to discern. In doubtful cases I generally refer to *Marasmius* any species with thick and firm gills, while those with membranous and crowded gills are retained in *Collybia*. Thus *Agaricus confluens* (= *Marasmius argyropus*) I place in *Collybia*. To lump the two genera in one, as KARSTEN does, appears to me rather rash.

But although fairly well separated from the adjoining genera the *Collybias* do not form a natural series of closely related species, but are rather heterogeneous. Such fungi as f. inst. *Collybia radicata* — *C. velutipes* — *C. racemosa* have certainly not very much in common. Still I shall not attempt to divide the genuine *Collybias* into subgenera. The old Friesian classification cannot, I believe, be much improved upon. Of his groups *Vestipedes* is the most unsatisfactory one, uniting, I think, too heterogeneous species and separating others which ought not to be kept apart (f. inst. *C. tenacella* and *C. conigena*). This group I have therefore partly disbanded.

With regard to the microscopic characteristics *Collybia* shows less variety than f. inst. *Lepiota*. As mentioned above cystidia are wanting in a good many species, and in most others they are rather inconspicuous, hairshaped or like short hyphæ on the edge of the gill. But in a few instances we find more characteristic cystidia. Thus *C. radicata* has large sack-shaped cystidia, in *C. velutipes* they are obtusely fusiform and in *C. tenacella* they are often more or less hooded. — The spores



are much more diversified and often afford an excellent means for identification. Not only they differ widely in size (from  $16 \times 10 \mu$  down to  $3 \times 2 \mu$ ) and shape (from narrow ellipsoid to almost spheric), but in some few species they also deviate from the ordinary type by being verruculose or sub-spinulose. Two-spored basidia — as in numerous species of *Mycena* and *Omphalia* — I have never observed in this genus.

The number of species found and figured in »Danmarks Agaricaceer« is 28. This is not alle the Danish species. SEV. PETERSEN (loc. cit.) enumerates several others. While some of these are very doubtful natives (or very dubitable species) others are distinct and really belong to our flora. Thus f. inst. *C. longipes*, *C. globularis* and *C. Micheliana* have been found by him and other mycologists, but I have not seen them.

## KEY

### TO THE SPECIES FIGURED OF THE GENUS *COLLYBIA*.

#### I. *ARMILLARIA*.

The stem with a distinct ring.

Surface of cap gelatinous. Spores very large, globose . . . *C. (Armillaria) mucida* (1)

#### II. *EU-COLLYBIA*.

No trace of veil or ring.

A. **Læticolores.** Gills generally white or yellowish.

α. **Striapedes** (Fries). Stem distinctly striate or grooved; rather large fungi, (stem 5 mm or more).

a. **macrospore.** Spores large ( $6 \mu$  or more broad).

1. Spores about  $10 \mu$  broad; stem generally with a long tapering »root«. . . . . *C. radicata* (2)

2. Spores  $6-7 \mu$  broad; stem truncate with creeping, white root-like mycelium-strings. . . . . *C. platyphylla* (3)

b. **microspore.** Spores rather small (less than  $5 \mu$  broad).

1. Spores globose.

\* Whole plant, when fresh, white or pale yellowish *C. maculata* (4)

☼ Cap rufous . . . . . *C. distorta* (5)

2. Spores ovate or ellipsoid.

\* Stem somewhat conical; gills crowded. . . . . *C. butyracea* (6)

☼ Stem sub-fusiform, rooting; gills distant. . . . . *C. fusipes* (7)

β. *Lævipedes* (Fries, extended). Stem almost even: small or medium-sized fungi (stem 0.5–5 mm broad).

- a. *viscida*. Cap viscid; Stem velvety, yellow to dark brown. *C. velutipes* (8)  
b. *sicca*. Cap not viscid.

1. Stem glabrous (or slightly pruinose).

\* Stem without a long »root«.

† Spores small (about  $5\mu$  long).

= Cap medium-sized ( $2\frac{1}{2}$ –5 cm; gills whitish (rarely pallid ochraceous) . . . . . *C. dryophila* (9)

= Cap small (2 cm); whole plant yellow . . . *C. macilenta* (10)

†† Spores larger (7–8 $\mu$  long) granulate. Cap fulvous. *C. nitellina* (11)

\* Stem with a long »root« (springing from cone of Picea) . . . . . *C. lenawella* (12)

2. Stem flocculose or felty.

\* Fasciculate, growing on the ground (dead foliage). *C. confluens* (13)

\* Solitary.

† Growing on rotten mushrooms, cones or on the ground. Spores very small (3–5 $\mu$  long).

o Not springing from a sclerotium. Growing on cones (of Pinus) . . . . . *C. conigena* (14)

o Springing from a sclerotium. (Growing on the ground or on mushrooms).

§ Stem without branches, pallid; sclerotium brown or ochraceous.

» Sclerotium dark brown, ellipsoid or pip-shaped . . . . . *C. tuberosa* (15)

» Sclerotium ochraceous, roundish . . . *C. cirrhata* (16)

§§ Stem blackish (with numerous branchlets); sclerotium black . . . . . *C. racemosa* (17)

†† Growing on dead grass (or sticks). Spores larger (6 $\mu$  or more long). . . . . *C. stipitaria* (18)

B. *Tephrophanæ* (Fries). Gills gray or pale dingy; cap hygrophanous, sordid. (Vide also no. 17).

α. Spores smooth.

a. Stem with a long tapering »root« . . . . . *C. raneida* (19)

b. Stem without »root«.

1. Spores ovate or ellipsoid.

\* Spores medium-sized (4 $\mu$  or more broad).

† Cap not striate; growing on the ground.

o Stem rather stout (4–6 mm) base strigosotomentose . . . . . *C. inolens* (20)

o Stem 3–4 mm, not strigose at base . . . . . *C. murina* (21)

† Cap pellucid-striate; growing on Sphagnum . . . *C. elusilis* (22)

\* Spores small,  $2\frac{1}{2}$ –3 $\frac{1}{2}\mu$  broad.

† Cap striate, umbonate . . . . . *C. miser* (23)

†† Cap not striate.

o Cap. 2–3 cm broad; odour very faint, mealy . . . *C. ozes* (24)

o Cap  $1\frac{1}{2}$  cm, foetid . . . . . *C. nephitica* (25)

2. Spores almost globose (cap striate) . . . . . *C. cessans* (26)

β. Spores verruculose or spinulose.

- a. Cap striate, dingy brownish . . . . . *C. crosa* (27)  
 b. Cap even, dark fuscous . . . . . *C. tesquorum* (28)

## SYSTEMATIC AND FLORISTIC NOTES.

### I. ARMILLARIA.

#### 1. *Collybia* (*Armillaria*) *mucida* (Schrad.).

Spores globular,  $13-18 \times 12-16 \mu$ , epispore very thick.

Figured specimens: »Frøens Bøge«, on fallen branch of *Fagus*, Oct. 1895. — On wounded trunks and dead branches of *Fagus* (as well when lying on the ground as when still on the tree), even high up (about 15 meter), often growing somewhat fasciculate. It sometimes appears to be a true parasite, but never attacks young and vigorous trees. Found everywhere, till late in the autumn.

### II. EU-COLLYBIA.

#### A. LÆTICOLORS.

##### a. STRIÆPEDES.

#### 2 a. *C. radicata* (Relh.).

Spores ovate,  $15 \times 10 \mu$ . Basidia 4-spored. Cystidia inflated, cylindric-sackshaped, about  $20 \mu$  broad.

Figured specimens: Hjallese, wood of *Fagus*, July 1905; forma *arrhiza*: Hjallese, July 1903.

Common everywhere in our beechwoods, very rarely met with outside. Although apparently growing on the ground it is, I believe, always a true xylophilous fungus, the »root« always springing from a tree-root, and varying in length according to the depth in which this root is running under the surface. — On superficially-running roots the fungus accordingly has no »root« at all, but only an alliform swelling at the base. This form:

forma *arrhiza*, I have found at Hjallese, July 1903, and in Aalykkeskov near Odense, 1911. — A more distinct form is

#### 2 b. *C. radicata* var. *gracilis* J. E. Lange.

Spores as in the typical form. Cystidia about  $40 \mu$  long, cylindric-subulate,  $2-3 \mu$  broad, base inflated, subovate.

Fig. specim.: Wood of *Fagus*, Hunderup 1897 (and 1900).

In this variety the cap is only about 2 cm broad, whitish-hyaline and somewhat transparent. The stem is white, somewhat downy, 8 cm high. The gills are subdecurrent. If the awlshaped cystidia are a constant feature, it must be regarded as a distinct species, although macroscopically very much like small forms of *C. radicata*.

### 3. *C. platyphylla* Fr.

Spores ovate-subglobose, generally  $6\frac{1}{2}$ — $8 \times 6$ — $6\frac{2}{3}$   $\mu$ , epispore thick. (1916: Spores  $7\frac{1}{2}$ — $8\frac{1}{2} \times 6$ — $7$   $\mu$ , pedicel somewhat lateral). Basidia 4-spored, clubshaped,  $7$ — $8$   $\mu$  broad. Cystidia sackshaped-clubshaped, about  $14$   $\mu$  broad. — The cells of the fibrils on the surface of the cap are ovate-clubshaped,  $12$ — $25$   $\mu$  broad, content grayish-brown (1916).

Fig. specim.: Hjallesø, on and around stump of *Corylus*, June 1897. — Not uncommon, especially on and about stumps of *Corylus*, from early summer. The mycelium always forms thick cottonyarn-like white strings. The form *repens* figured by FRIES (Icon. sel. tab. 61) shows this creeping mycelium more luxuriously developed than usual, but should certainly not — as done by SACCARDO (Syll. fung. V.) — be put up as a distinct species.

### 4. *C. maculata* (Alb. et Schw.).

Spores almost globular,  $4$ — $5\frac{1}{2} \times 3$ — $4\frac{1}{2}$   $\mu$ . (A.)

Fig. specim.: A) Aarup, wood of *Picea*, Oct. 1896. B) Trollebørg, open grassy space about a wood of *Picea*, Sept. 1897.

Not rare in woods of *Picea* and in adjoining open spaces among grass and heather. Figure A. represents the main type: the stout-stemmed form with almost pure white, rather small cap. Fig. B. is the more slender and laxe form with pallid-rufous cap. A yellowish, slender form (*C. scorzonera* Batsch) is also occasionally met with.

### 5. *C. distorta* Fr.

Spores globose,  $3\frac{1}{2}$ — $4 \times 3\frac{1}{4}$ — $3\frac{1}{2}$   $\mu$ .

Fig. specim.: »Sønderhav« near Flensborg, gregarious about stump of *Picea*, Oct. 1900. — Also found in similar locality at Holte (1900) and Aarup (1910).

Although habitually very well characterized this species is not clearly distinguished from the preceding species, the slender form of which forms a connecting link. — The peculiar denticulate marginal veil shown in Fries' figure (Icon. sel. fig. 63<sup>1</sup>) seems to be a licentia pictoria.

(The plant described by RICKEN (loc. cit.) under the name *C. proluxa* (Fl. Dan.), with serrulate gills and 3—5 cm broad cap appears to be a form of *C. distorta*. *C. proluxa* according to FRIES is a much larger plant with entire-edged gills).

6. **C. butyracea** (Bull.).

Spores ovate-lanceolate,  $6\frac{1}{2}$ — $7 \times 3$ — $3\frac{3}{4}$   $\mu$ .

Fig. specim.: Hjallese, wood of *Fagus*, Okt. 1896. — Very common (often forming »fairy-rings«) as well in beechwoods as in coniferous woods. This species varies very much especially in colour. In woods of *Fagus* the paler (occasionally almost white) form (fig.) is the predominating type; while the very dark rufo-fuscous or almost sootbrown form is common in our coniferous woods. This latter type often has the stem (all over or from the base upwards) clad with short, adpressed, pallid hairs. This probably constitutes *Ag. trichopus* Pers.

7. **C. fusipes** (Bull.).

Spores varying from  $5$ — $8 \mu$  l.,  $3$ — $4 \mu$  broad. Cystidia crowded, hairshaped (somewhat wavy), about  $2 \mu$  broad. (1911: Spores  $5$ — $6 \times 3\frac{1}{2}$ — $4 \mu$ ).

Fig. specim.: Aarup, fasciculate on and around a stump in wood of *Fagus*, Okt. 1896. — Also found in »Purreskov« near Hesselager, Aug. 1911, about a living beech.

As shown in my figure the fructifications spring from an ascending, rhizome-like black rhizomorpha. The figured form is most nearly *Ag. oedematopus* Schaeff., while the specimens found in 1911 belonged to a more slender-stemmed, pale form (cap the colour of calfskin) almost answering to the description of *Ag. contortus* Bull. But they are hardly specifically distinct.

 $\beta$ . LÆVIPEDES.a. *Viscidæ*.8. **C. velutipes** (Curt.).

Spores: in figured specimens:  $9$ — $12 \times 2\frac{1}{2}$ — $4 \mu$  (uncommonly long); in most cases:  $7\frac{1}{2}$ — $10 \times 3\frac{1}{2}$ — $4 \mu$ , cylindric-ellipsoid. Cystidia conic, rather acute, almost subulate,  $8$ — $12 \mu$  broad, protruding part  $18$ — $30 \mu$  long. The velvet coating on the stem is made up of long, wavy, about  $4 \mu$  broad, yellow-brown hairs.

Fig. specim.: Tarup near Odense, on stump of *Fraxinus*, Sept. 1895.

Common, often fasciculate, especially on fresh stumps and living trunks of *Ulmus*, *Fraxinus* and *Populus*. Also parasitic on *Sambucus racemosus* etc. Only once I have met with this species on coniferous wood (a single small specimen on a pole (of *Picea*)). — Occasionally it is quite dwarfy; I have seen a form, in which the cap was only 14 mm, the whole plant pale yellow.

b. *Siccæ*.9. **C. dryophila** (Bull.).

Spores  $5 \times 3\frac{1}{4} \mu$ . Cystidia rather inconspicuous, somewhat wavy (and occasionally branched), hairshaped or slightly inflated.

Fig. specim.: Hjallesø, on the ground in wood of *Fagus*, May 1897.

This exceedingly common mushroom, which begins to appear already in spring or early summer, varies very much in colour (from dark date-brown to almost white or very pale ochraceous: (In a wood of *Picea* (Tommerup 1898) I have even met with a pure white, very small form). Also the gills vary in colour (from pure white to pallid gilvous or even ochraceous).

#### 10. *C. macilenta* Fr.

Spores ovate,  $4\frac{1}{2}$ — $5\frac{1}{2} \times 2\frac{1}{2}$ — $3\mu$ . Basidia 4-spored. Cystidia hairshaped, somewhat nodulose or wavy.

Fig. specim.: Gerup, near Korint, on boggy ground in wood of *Picea*, solitary, July 1900.

#### 11. *C. nitellina* Fr. (forma *minor* Fr.).

Spores  $7\frac{1}{2} \times 4\frac{1}{4}\mu$ , obliquely ovate, with a somewhat lateral pedicel, granulate-rough. Basidia 4-spored. No cystidia.

Fig. specim.: Langesø, on the ground behind a garden-railing in mixed wood, Sept. 1916 (few specimens).

This little fungus, well figured by Fries (Icones sel. 65<sup>2</sup>), differs habitually very much from the larger type (Icones sel. 65<sup>1</sup>). Perhaps it should be regarded as a distinct species, although the spores are similar to those of the large type figured by RICKEN (l. cit. tab. 108). — The plant figured by COOKE (l. cit. fig. 146) can hardly be a true *C. nitellina*.

For comparison I add a brief description of my plant: Cap about 1 cm, flat, umbonate, margin incurved, hygrophanous, dark fulvous. Stem glabrous, lucid, light fulvous, towards the base paler and slightly white-tomentose, somewhat hollow,  $3\frac{1}{2}$  cm long,  $2\frac{1}{2}$  mm broad. Gills whitish, with a tinge of ochraceous, rather narrow. It has a faint rancid odour.

#### 12. *C. tenacella* (Pers.).

Spores ovate-oval,  $5$ — $7 \times 3$ — $4\mu$ . Cystidia on edge and face of gills cylindric-fusoid, about  $10\mu$  broad, varying (even on the same gill) from somewhat pointed to almost capitate (contracted a little below the apex, thus forming a kind of head, which often at first is covered with a granulate-warty hood).

Fig. specim.: I »Frøens Bøge«, Nov. 1895; II Vormark, Oct. 1896 (on cones of *Picea*).

This nice little fungus is common in our woods of *Picea* on fallen cones, even deeply buried ones, in which case the «root» is long and ascending. The colour of the cap varies from pure white to dark datebrown. The stem, which appears to be glabrous, has a faint bloom. When examined under the microscope this bloom is seen to be, in fact, very scattered, erect, hyaline, very short hairs (about  $20\mu$  long).



BRESADOLA (Fungi tridentini, tab. 198<sup>1-2</sup>) figures two types, a dark fuscous and a somewhat ochraceous one, which he calls *C. conigena* and *C. esculenta* and takes to be included in the *Ag. tenacellus* of Persoon (*C. conigena* in the Friesian sense he evidently does not know). — It seems to me somewhat doubtful whether they can be kept apart. The chief difference appears to be the colour of the cap and the form of the cystidia. But as stated above the form of the cystidia varies even on the same gill. *C. conigena* sensu Ricken (loc. cit.) is my *C. tenacella*.

### 13. *C. confluens* (Pers.).

Spores ellipsoid, base rather pointed,  $6\frac{1}{2} \times 3\frac{1}{2} \mu$  (or  $7\frac{1}{2} \times 3\frac{3}{4}$ ). Cystidia hairshaped, somewhat nodulose.

Fig. specim.: Hjallesø, in wood of *Fagus*, on the ground among foliage, Oct. 1896.

Common, as well in woods of *Fagus* as of *Picea*, densely fasciculate (often growing in large circles) amongst dead foliage. — It varies very much in colour according to age and atmospheric conditions. When dry it is pale, and when old dry specimens revive in wet weather they become sordidly incarnate or brownish. It forms a transition to *Marasmius*. And like SCHROETER (loc. cit.) I do not see any real difference between this plant and *Marasmius argyropus* («archyropus» auct. div.).

### 14. *C. conigena* (Pers.).

Spores ellipsoid-ovate, very small,  $3 \times 1\frac{3}{4} \mu$  (or  $3\frac{1}{2} \times 1\frac{3}{4}$ —2). Edge of gills with obtusely fusiform, about  $7 \mu$  broad cystidia (the free part of the cystidium is about  $25 \mu$  long).

Fig. specim.: Trolleborg, on cones of *Pinus*, Oct. 1898 (and later years). — Found in several places. Unlike *C. tenacella* it prefers cones of *Pinus*. Only once I have met a few specimens growing on a cone of *Picea excelsa*. Cooke's figure (loc. cit. tab. 30) is excellent. See also no: 12. — *Collybia myosurus*, to judge from the descriptions of Fries, Ricken and others, is too closely related to *C. conigena* to be maintained as a distinct species.

### 15. *C. tuberosa* (Bull.).

Spores subglobose-ellipsoid,  $3-4 \times 2-3 \mu$  or  $4-5 \times 2\frac{3}{4}$  (fig. specim.).

Fig. specim.: »Vaasemose«, in mixed wood on the ground amongst sticks and foliage, Oct. 1901. — Rather common, generally growing on dead mushrooms (*Lactarius deliciosus*, *Russula nigricans* etc.). The form and colour of the sclerotium most clearly distinguish this species from *C. cirrhata*.

### 16. *C. cirrhata* (Schum.)

Spores ovate-ellipsoid,  $4-6 \times 2-3 \mu$  (or ovate,  $4\frac{1}{2} \times 2\frac{3}{4}$ ). Cystidia 0



Fig. specim.: Hjallese, in copsewood on leaf-mouldy ground about an old stump, Oct. 1898. — Very common on and around old stumps, amongst dead foliage and rotten fungi, often gregarious. — If carefully examined the fibrillous »root« can, I believe, always be traced to a sclerotium. (MASSEE (European Fungus Flora) erroneously states that it is devoid of sclerotium.).

17. **C. racemosa** (Pers.).

Spores ovate-ellipsoid,  $4\frac{1}{2} \times 2\frac{1}{2} \mu$ .

Fig. specim.: 1) Hesselagergaard, in deep moss in a ditch in young plantation of Picea, Oct. 1905. 2) Hjallese, on the ground about stump of Populus, gregarious, Sept. 1908. —

The cap is often abortive like the rudimentary heads on the lateral branchlets. Fries in »Hymenom. Europ.« says the gills are white. In my plant they are hoary gray (as described by Quélet (loc. cit.).

18. **C. stipitaria** Fr. (*Ag. caulicinalis* Bull.).

Spores ovate,  $8 \times 6 \mu$  (or oval  $6\frac{1}{2} \times 4$  or  $9 \times 5 \mu$ ). Cystidia crowded, cylindric-hairshaped, obtuse, about  $4 \mu$  broad.

Fig. specim.: Hjallese, on dead tufts of grass (Dactylis), Oct. 1896. — Common, especially on Dactylis, from August to January. I have also seen it growing on rye-stubble (Secale) (Aug. 1900). In this case it must either have attacked the living rye-plant or have developed very quickly in the stubble. —

It is also occasionally met with on dead stems of Syringa (Gudbjærg, January 1900) and on dead twigs of Picea (Vormark, Oct. 1901.).

This tiny little plant is very much like a Marasmius. According to QUÉLET *M. scabellus* (Alb. & Schw.) is identical. But he describes this latter species with »spores sphériques,  $12 \mu$ , pointillées«. — *M. epichloë* Fr. also appears to be identic.

## B. TEPHROPHANÆ.

19. **C. rancida** Fr.

Spores ellipsoid,  $7-8 \times 4\frac{1}{2} \mu$ .

Fig. specim.: Hjallese, wood of Quercus and Corylus, Oct. 1896. Rather common, but solitary, chiefly in deciduous woods, till late in the season. It has a superficial likeness to Mycena polygramma.

20. **C. inolens** Fr.

Spores ellipsoid,  $7-8 \times 4-5 \mu$ .

Fig. specim.: Hæsbjerg, somewhat gregarious on the ground in wood of Picea, Oct. 1899. — Not. common.

It has a faint mealy smell. My plant corresponds to the umbonate form figured by Fries (Icon. sel. tab. 69<sup>3</sup>). His other form (69<sup>4</sup>) seems to me rather divergent.

21. **C. murina** (Batsch) *var.*

Spores  $6\frac{1}{2}$ — $8 \times 4$ — $5 \mu$ .

Fig. specimen: Aarup, mixed coniferous-foliaceous wood, Oct. 1896. — This species is met with occasionally especially in foliaceous woods, somewhat gregarious. It has a very slight mealy smell. — My plant differs from the Friesian description by not becoming umbilicate.

22. **C. clusilis** Schroet. (Fr.?).

Spores ovate,  $6$ — $7 \times 4\frac{1}{2} \mu$ . Basidia 4-spored. Cystidia 0.

Fig. specimen: »Sortso«, in wood at Gerup near Holstenshus, on Sphagnum, July 1910. — Also found (on Sphagnum) in other localities of the same district, July—Aug. 1914.

This little Collybia, which reminds one of an Omphalia, is very well described by Schroeter (loc. cit.). *C. obstans* Britz. appears to be identical. It has a very faint somewhat mealy smell.

*C. clusilis* seems to be very differently conceived by the leading mycologists. Probably the form B., mentioned by FRIES as growing »in pratis post largas pluvias, inter Hypna«, is my plant, although his description does not fit very well. The plant described by QUÉLET (Flore mycol.) as growing in woods and on sandy heaths can hardly be identical. COOKE's figure is not like my plant, and »*C. clusilis*« of KARSTEN has larger spores ( $7$ — $9 \times 5$ — $6 \mu$ ).

23. **C. miser** Fr. *var.*

Spores ellipsoid,  $7\frac{1}{2} \times 3\frac{1}{2} \mu$ . Cystidia 0.

Fig. specimen: Stenløse, on the ground in shady wood of *Corylus* and *Fagus*, Sept. 1905 (and 1916).

My plant agrees fairly well with the figure (Icon. sel. 70<sup>4</sup>) and description of FRIES, but grows in foliaceous woods, and the gills are not exactly »cinerea« but rather pallid-sordid. The apex of the stem is slightly pruinose. KARSTEN (loc. cit. pag. 106) describes the spores as being  $7 \mu$  long, minutely prickly (»fintaggiga«).

24. **C. ozes** Fr. *var.* (?) Plate III fig. 2.

Spores ovate  $4\frac{1}{2}$ — $5 \times 3 \mu$ . Basidia 4-spored. Cystidia 0.

Fig. specimen: Aarup, gregarious on the ground amongst dead needles in wood of *Picea*, Aug. 1915. — Also found in same locality 1916, and at Kirkeby, in wood of *Picea*, Oct. 1915 (a pale form).

As my plant diverges somewhat from the description of Fries I add a short diagnosis: Cap about 2 cm, hygrophanous, even

at first convex, then flat or slightly depressed, brownish fuscous (when dry pale sordid or almost clay-coloured). Stem hollow, often somewhat rooting, dark fuscous, everywhere with white silky fibrils, base white-tomentose, 4 cm  $\times$  5 mm. Gills sordid, paler towards the edge, crowded. Rancid odour not very strong.

It differs from *Clilocybe ditopoda* by the rounded-adnate gills and the ovate spores. My plant appears to be the same as described by Sev. Petersen (loc. cit.).

## 25. *C. mephitica* Fr.

Spores oval,  $3\frac{1}{2}$ —4  $\times$   $2\frac{1}{2}$   $\mu$ . Basidia 4-spored. Cystidia 0.

Fig. specim.: Ravnholt, gregarious on the ground in wood of Picea, Oct. 1902. — This tiny little mushroom is well characterized by its disagreeable smell and by the dark sordid-gray gills, which are darker than the cap.

## 26. *C. cessans* Karst.

Spores ovate-globose,  $5\frac{1}{2}$ —6  $\times$   $4\frac{1}{2}$ —5  $\mu$ . Basidia 4-spored. Cystidia on edge cylindric-hairshaped. (1914: Cystidia 60—65  $\times$  10—12  $\mu$ , slightly swelled in the middle).

Fig. specim.: »Frøens Bøge«, gregarious in wood of Abies, Oct. 1903. — Also found in several other places 1904—14.

Karsten's description fits my plant very well. FRIES (in *Epicrisis* pag. 92) describes *C. cessans* as a variety of *C. stolonifera* (= *tenacella* var.), what my plant certainly is not. — Except for the not decurrent (but horizontal, slightly ventricose, adnate) gills and the very short stem this species is very near to *Omphalia striatpilea* Fr. (nec Quélet), perhaps not really distinct. — Sev. PETERSEN and SACCARDO describe the spores: 7—9  $\times$  5—6  $\mu$ , much larger than in Karsten's plant (loc. cit. p. 107).

## 27 a. *C. erosa* Fr.

Spores subrotund-oval, almost spinulose, 7  $\times$   $5\frac{1}{2}$   $\mu$ . Cystidia 0. (1909 and -14).

Fig. specim.: Aalsbo, border of walk in wood of Picea, 1909. — Also at Rudne 1914.

## 27 b. *C. e.* forma *gracilis*.

Spores  $5\frac{1}{2}$ —7 $\frac{1}{2}$   $\times$   $5\frac{1}{2}$   $\mu$ , nodulose-stellate. Basidia 4-spored.

Fig. specim.: Aarup, mossy ground in Picea-plantation, solitary, Oct. 1904. A slender form, almost like a small *Mycena*. Cap convex, with a small wart-like umbo, dingy brownish, 0,5 cm broad. Stem 3 cm  $\times$  0,6 mm. of the same colour. Gills rather broad, somewhat adnate.

QUÉLET (loc. cit.) describes the spores of *C. erosa* »ovoide-pruniforme« 6—7  $\mu$ , but does not mention their warty epispore.

28. *C. tesquorum* Fr.

Spores subrotund-oval,  $7 \times 5\frac{1}{2} \mu$ , minutely warty-spinulose (like a *Russula*-spore). Basidia 4-spored Cystidia 0.

Fig. specim.: Between Tommerup and Hæsbjerg, on somewhat peaty ground in meadow outside a beechwood, Oct. 1901.

My plant is more short-stemmed and more evidently umbonate than Fries' figure. It seems to be very nearly allied to *C. tylicolor*, which, according to QUÉLET, has similar spores but is more ashy-gray. In my specimens the cap is dark fuscous, 1–2 cm broad, almost even, submembraneous; the gills broad, rather distant, strongly emarginate, almost free, and the stem short (2 cm), fuscous, apex slightly white-plumulose.

For figures of spores etc. of the several species vide plate I.

## THE GENUS INOCYBE.

While FRIES (in »Hymenomycetes Europæi«) only describes 45 species of *Inocybe* (as here understood), the number mentioned in BATAILLE'S »Flore analytique des *Inocybes* d'Europe« is about 100. This extraordinary increase (from 1870—1910) is partly explained by the fact, that just about the time of publication of »H. E.« the use of the microscope was introduced in this field of mycology. And one of the first results of this was that a good many species of *Inocybe*, which hitherto it had been almost impossible to distinguish, were easily recognised by their different type of spore: smooth or nodulose-stellate.

But the discovery of this reliable and practical means of identification made great havoc to the whole system of classification. In cases where an old polymeric species was seen really to comprise 2 or 3 distinct ones, it was almost impossible to make out which of these new species could rightly claim the old name. Thus in later works we find the old names *I. scabella*, *I. carpta*, *I. fastigiata*, *I. hiulca* etc. attached to as well smooth-spored as roughspored species in a most bewildering way. — When later on the characteristic difference of the cystidia was also introduced in the diagnoses as a new and valuable means to distinguish species which have a superficial likeness to each other, this new step in advance in many cases increased the confusion in such a way, that now one almost feels inclined to throw the table over end and start afresh with entirely new names for all the species that can be distinguished by the means now available.

This however is out of the question; but occasionally — f. inst. in the case of »*I. rimosa*« — I deem it advisable entirely to drop the old name; because it evidently was not a specific but a collective name, embracing several common species. »*I. rimosa*« of the ancient authors to my mind includes *I. brunnea*, *I. Cookei*,

*I. sabrimosa*, *I. asterospora* etc., all very common species which were not then recognised as such. »Type-specimens«, by means of which the priority-right to an old name could be ascertained, as a rule do not exist; and the »type-figures« may be interpreted to represent anything or nothing.

Classification. After the discovery of the characteristic differences in the shape of the spores, the splitting up of the genus *Inocybe* by creating a new genus (*Clypeus* (Karsten), *Astrosporina* (Schroeter)) to embrace all the rough-spored species, was soon proposed. But it appears to me hardly the right thing to do. *Inocybe* in the old sense is a very »natural« genus: one almost at a glance recognises an *Inocybe*. And to disband such a natural entity I cannot consider an improvement.

But of course the characteristic microscopic differences must needs be accorded a prominent place in any classification propounded. And consequently a rational systematic classification cannot entirely follow the lines laid down by FRIES. This eminent mycologist, it will be remembered, divided the genus in several series, chiefly characterized by the nature of the surface of the cap. But although these characters are evidently very valuable for purposes of classification, they lack a good deal in preciseness, and moreover are greatly influenced by the age of the specimens and the atmospheric conditions. Not so the microscopic characteristics. I therefore accord to these the more prominent place.

Of the microscopic characteristics the shape of the spore is the one most easily ascertained and most marked. We thus get two main tribes or subgenera, the smooth-spored (*Euinocybe*) and the rough-spored (*Clypeus*). But this latter tribe again includes two different types: In most of the rough-spored species the spore is substellate or nodulose, but in some few small ones the spore is subglobose or broadly oval, set with long, acute or somewhat obtuse spinelets.

The cystidia come next in importance for purposes of classification. Cystidia of some kind or other are never wanting in the *Inocybes*. But while a good many, especially of the smooth-spored species — have cystidia of a rather trivial kind (inflated clubshaped or the like, almost like overgrown sterile basidia) the rest have cystidia of a kind particular to this genus: fusoid-ventricose or almost bottleshaped with a crest of small cristalloid muriculate bodies. In some species both kinds occur



together, but in such cases those on the face of the gill are always of the crested type, while the edge is provided with both kinds, occasionally with intermediate forms. The trivial kind never occurs on the face of the gill. Some authors, f. inst. MASSEE and BATAILLE, reserve the name *cystidia* for the muriculate type only, and consequently divide the species in cystidiate and cystideless series.

When we come to the minor subdivisions the old Fries'ian characters must be taken into consideration. But of the 5 tribes established by him the last and smallest (*viscidi*) is broken up by removing *Agaricus Tricholoma* and its allies from the genus altogether (as is now generally done); and the remaining species — which are however unknown to me — probably better can be placed within one group or other of the remaining 4, as they naturally fall in with the subviscid species of these (f. inst. *I. umbrina* and *I. prætervisa*). With regard to the remaining Fries'ian tribes I think the line of demarcation between *squarrosi* and *laceri* is rather vague; and the same may be said of *rimosi-velutini*. I therefore deem it more practical to unite 1 & 2 and 3 & 4 respectively.

Although the smell of most fungi is very characteristic and constant, it is of small value for classification-purposes, as it is too difficult to define. Very few, if any, of the *Inocybes* are entirely inodorous, most of them have a faint but disagreeable »earthy« or spermiatic smell. But the strong aromatic smell of *I. pyriodora* and several other species — generally compared to the smell of *Calycanthus*-flowers or over-ripe pears — is so unmistakable that it can be profitably used for characterizing this little group of closely related species.

The minor details of my classification can be seen in the Key and will require no particular explanation.

From the adjoining genera *Inocybe* is generally well distinguished. Some modern authors (SCHROETER, SEV. PETERSEN a. o.) transfer the indusiate species of *Hebeloma* to *Inocybe*, but this can hardly be considered a real improvement. The indusiate and the veil-less *Hebelomas* are so intimately related in all other respects (also with regard to their microscopic characteristics) that I think it absolutely preferable to maintain the old Fries'ian line of demarcation. To separate f. inst. *H. longicaudum* and *H. testaceum*, *H. crustuliniforme* and *H. fastibile* cannot be done without ignoring true relationship. Besides, if veil or no veil is



to be the only and decisive test, some of the *Inocybes* — which have practically no velum parziale — would have to go too, and the whole would end in utter confusion. — The little elegant *A. petiginosus* in later years was referred by Fries to *Hebeloma*, although he had formerly recognised it as an *Inocybe*. Its nodulose spores naturally take it back to *Inocybe* (as done by almost all modern authors).

Some of the very smallest species, f. inst. *I. calospora*, have a habitual likeness to *Naucoria*. In fact, according to Quélet, two of the species which FRIES placed within the genus *Naucoria* (*N. pannosa* and *N. sublimbata*) have stellate or spinulose spores and should be transferred to *Inocybe* (*Clypeus*); (vide BATAILLE »Flore analytique« pag. 22). — *Flammula* also comprises a few species (from the tribe *sericelli*) which connect this genus with *Inocybe*. This is especially true of what I call *F. Agardhii* (Lund), which is, I believe, identic with *Inocybe xanthica* (von Post) (L. Romell in lit). Also *Inocybe delecta* Karst. has much in common with the *Flammula sericelli*. — The *Cortinari* will very rarely be confounded with the *Inocybes* by the trained mycologist.

The number of species found and figured by me is 47, that is to say as many as Fries had on record from the whole of Europe, and one third more than he had seen alive. Still I do not doubt my number is too small. No year has passed during my 24 years of investigation in this line without adding to the number of species found. And other mycologists have met with species which I have not seen and which seem to be distinct from any of mine. Thus among the 33 species mentioned by SEV. PETERSEN (loc. cit.) is *I. mutica*, which appears to be a very well defined species. On the other hand some of the »species« figured by me are so intimately related, that it is somewhat doubtful whether they deserve a specific name. Still I think it better provisionally to uphold the existing names than to unite too many forms under one specific name, as long as their whole nature is not more precisely known. Coming mycologists will have to settle such questions, when the whole field is more thoroughly investigated.

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# KEY

## TO THE SPECIES FIGURED OF THE GENUS INOCYBE.

### I. EU-INOCYBE (P. Hennings).

spores smooth, generally ovate or phaseoliform.

A. **Muriculatæ.** Cystidia (or at least some of the c.) subfusoid or ventricose, often crested with cristalloid muriculate bodies.

α. **Pyriodoræ.** The whole plant has a strong sweetish-aromatic smell (almost like Calycanthus-flowers).

a. Cap whitish or brownish ochraceous.

1. Cap rather obtuse, fibrillose (or subsquamose), more or less ochraceous.

\* Large and stout. The stem (and occasionally also the cap) becomes flushed with bright incarnate *I. incarnata* (1)

\* Somewhat smaller, Stem never bright incarnate (only the flesh slightly so, especially in the stem) . . . *I. pyriodora* (2)

2. Umbo acute; cap whitish, then pale clay-colour. . . *I. albidula* (3)

b. Cap obtuse, with bistre or dark brown adpressed scales *I. scabra* (4)

β. **Ingratæ.** Smell wanting or faint, disagreeable (earthy or spermatic.

a. **squarrosæ-laceræ.** Cap squarrose or tomentose-squamulose.

1. Stem with squarrose scales . . . . . *I. Hystrix* (5)

2. Stem flocculose-fibrillose.

\* Spores almost cylindric, long. Flesh brownish . . . *I. lacera* (6)

\* Spores subovate or phaseoliform.

† Cystidia on edge brown. Surface of cap dark brown, (apex of stem at first often bluish).

≈ Cap small ( $1\frac{1}{2}$  cm), set with erect minute scales. . . . . *I. cinnabala* (7)

≈ Cap larger (2—3 cm), tomentoso-squamulose *I. obscura* (8)

†† Cystidia hyaline. Cap pale or grayish brown.

≈ Stem pale lilac . . . . . *I. griseo-lilacina* (9)

≈ Stem pallid or somewhat brownish.

§ Cap small ( $1\frac{1}{2}$  cm), clad with whitish fibrils and fibrillose scales . . . . . *I. abjecta* (10)

§§ Cap larger (2— $3\frac{1}{2}$  cm), dull brown (grayish or subfulvous), tomentose and fibrilloso-squamulose . . . . . *I. flocculosa* (11)

b. **rimosæ-velutinæ.** Cap fibrillose, when expanding either rimose or almost smooth, sometimes slightly innato-squamulose

1. Spores medium-sized, over 8 μ long.

\* Apex of stem at first violet or bluish.

† Cap brown, somewhat rimose . . . . . *I. pusio* (12)

- †† Cap lilac (becoming pale) silky-fibrillose. . . . *I. geophylla* (13)  
 \*\* Stem not bluish.
- † Cap whitish when young.  
 = Cap small (2 cm), acute.  
 § Cap becoming pallid with age. *I. geophylla* v. *alba* (13 b)  
 §§ Cap soon flushed with tile-red or light red . . . . . *I. geophylla lateritia* (13 c)  
 ≡ Cap larger (3–5 cm), rather obtuse.  
 § Cap (and other parts) soon more or less flushed with incarnate; stem without striae . . . . . *I. rubescens* (14)  
 §§ Cap becoming pale clay-white; stem minutely striate . . . . . *I. sindonia* (15)
- †† Cap brownish or ochraceous.  
 = Cap ochraceous or pale dingy brown.  
 § Cap pale dingy brownish, soon more or less diffracto-squamose; stem minutely-striate . . . . . *I. deglubens* var. (16)  
 §§ Cap ochraceous.  
 > Cap more or less squamulose; young stem pruinose.  
 ( Cap medium-sized (2–4 cm); stem whitish . . . . . *I. caesariata* (17)  
 (( Cap small (1–2 cm); stem yellowish. *I. hirtella* (18)  
 > Cap more or less rimose (not squamulose); stem not pruinose.  
 ( Cap medium-sized (3–5 cm) . . . . *I. posternula* (19)  
 (( Cap small, about 1½ cm . . . . . *I. auricoma* (20)
- °° Cap rather dark brown; stem without striae.  
 § Cap medium-sized (2–4 cm); stem and edge of cap fibrillose . . . . . *I. pallidipes* (21)  
 §§ Cap small (1–2 cm); stem not fibrillose *I. descissa* (22)
2. Spores small (6–7 µ long; cap smooth, brownish, 1–1⅓ cm . . . . . *I. microspora* (23)

B. **Depauperatæ.** Cystidia not crested, clubshaped or basidiiform (only found on the edge of the gills).

α. **Pyriodoræ.** Smell strong, sweetish-aromatic.

Cap fibrillose, somewhat squamulose; flesh turning pink. *I. Bongardii* (24)  
 (vide also no. 3.)

β. **Ingratæ.** Smell wanting or faint, disagreeable.

a. **squarrosæ-laceræ.** Cap squarrose or tomentose-squamulose.

1. Cap and stem squarrose, dark brown . . . . . *I. calamistrata* (25)

2. Cap velvety-squamulose, fulvo-ochraceous; stem fibrillose. . . . . *I. delecta* (26)

b. **rimosæ-velutinæ.** Cap rimose or almost smooth, (sometimes with adpressed, fibrillose scales).

1. Stem with a submarginate bulb; cap ochraceous. . . *I. Cookei* (27)

## 2. Stem without distinct bulb, almost equal.

\* Flesh not turning red or incarnate.

† Cap subfulvous-ochraceous, central part with adpressed fibrillose scales . . . . . *I. squamata* 28

†† Cap without scales, subrimose or fibrillose.

o Cap ochraceous, distinctly rimose; gills at first pale yellowish . . . . . *I. fastigiata* 29

oo Gills at first pallid.

§ Cap not distinctly rimose, very large, with dark umbo, paler towards the edge . . . . *I. pertata* 30§§ Cap distinctly rimose, deep brown . . . . *I. brunnea* 31

\*\*Flesh turning purplish-red or pale incarnate.

† Cap rather large, with dark violet-fuscous fibrils. Flesh turning purplish-red . . . . . *I. jurana* 32†† More slender. Cap pallid-ochraceous. Stem when cut or bruised turning pale rosy . . . . . *I. rhodiola* 33

## II. CLYPEUS (Karsten).

Spores spinulose, stellate or nodulose.

A. **Calosporæ.** Spores subrotund, spinulose.Cap somewhat scaly, 1<sup>1</sup>/<sub>2</sub>—2 cm . . . . . *I. calospora* 34B. **Astrosporinæ.** Spores stellate or nodulose-angular.α. **Muriculatæ.** Cystidia (or at least some of them) subfusiform, apex generally crested with muriculate bodies.

a. Spores almost stellate (with conical, blunt or rather acute projections).

1. Stem with a marginate bulb, pruinose.

\* Cap strongly rimose with dark brown fibrils. Stem minutely striate, pruinose, becoming brown. . . *I. asterospora* 35\* Cap ochraceous, subrimose. Stem whitish-ochraceous. . . . . *I. practervisa* 362. Stem almost equal, subglabrous, white; cap pallid or somewhat clay-brownish, fibrillose. . . . . *I. fibrosa* 37

b. Spores nodulose.

1. Spores rather large (over 8 μ long).

\* Stem bulbous.

† Cap not rimose, dingy; cuticle formed of whitish silky fibrils . . . . . *I. grammata* 38

†† Cap somewhat rimose, brown.

o Cap not viscid, rather acute.

§ Rather large (cap 3—5 cm . . . . . *I. napipes* 39§§ Cap small (2 cm . . . . . *I. umboninota* 40)oo Cap subviscid, rather obtuse . . . . . *I. umbrina* 41

\*\*Stem almost equal.

† Cap large, dark brown, tomentose and somewhat squamulose. . . . . *I. plumosa* 42

(Cap pallid or argillaceous; vide no: 37.)

- †† Cap smaller (1—3 cm).  
 ° Cap fibrillose-tomentose, grayish-brown,  $1\frac{1}{2}$ —3 cm . . . . . *I. lanuginella* (43)  
 °° Cap subrimose, brown, small (1 cm). . . . . *I. pulilla* (44)  
 2. Spores small (7—8  $\mu$  long). Young cap covered with whitish squamules or fibrillose scales, small (1—2 cm).  
 \* Subfasciculate; stem not everywhere pruinose (only slightly flocculose). . . . . *I. rufo-alba* (45)  
 \*\*Solitary. Stem brown, everywhere pruinose . . . *I. petiginosa* (46)  
 3. depauperatæ. Cystidia not crested, obtuse, inflated club-shaped or somewhat ventricose).  
 Cap dark brown, tomentoso-squamose. Stem flocculose, brownish . . . . . *I. lanuginosa* (47)

## SYSTEMATIC AND FLORISTIC NOTES.

As many of the *Inocybes* can only be distinguished by minute details which it is often almost impossible to depict with sufficient exactness, I think it not superfluous to give more detailed notes on their macroscopic characteristics than usual in these studies.

Spores etc. of all the species are figured on plate II.

### I. EU-INOCYBE.

#### A. MURICULATÆ.

##### $\alpha$ . PYRIODORÆ.

##### 1. *Inocybe incarnata* Bres. (= *I. pyriodora* var.).

Spores broadly ovate,  $6\frac{1}{2}$ — $10 \times 3\frac{1}{2}$ —6  $\mu$ . Cystidia inflated bottle-shaped, about 12—18  $\mu$  broad, muriculate.

Figured specimens: Marselisborg near Aarhus, under young beeches, moist ground in wood, Oct. 1916 (leg. POUL LARSEN). Rare.

Very nearly related to the ordinary *I. pyriodora*, but more robust (stem over 1 cm). The cap is at first almost smooth, pallid-ochraceous or whitish clay colour, then somewhat fibrillose-subsquamulose, ochraceous-brownish, somewhat flushed with

incarnate. The stem is at first white, then (except base and apex) tinged deep and rich incarnate or pinkish. Flesh of stem incarnate, of cap paler.

## 2. *I. pyriodora* (Pers.).

Not figured.

The typical or intermediate form of the *pyriodora*-group (well figured by BRESADOLA (loc. cit. tab. 52) is not very common with us, but met with occasionally in foliaceous woods. The cap is somewhat ochraceous, scaly-fibrillose. The flesh is often almost without a tinge of incarnate. Such specimens, especially if the umbo is somewhat conic and the cap without scales, form a transition to *I. albidula* (no. 3).

## 3. *I. albidula* Britz. ex Sacc. (?). Plate III, fig. 3.

Spores obliquely ovate,  $9 \times 5\frac{1}{2} \mu$ . Cystidia on edge of two kinds: a) inflated-fusoid,  $13-16 \mu$  broad, muriculate; b) inflated-clubshaped or roundish,  $10-15 \mu$  broad.

Fig. specim.: Hunderup, wood of *Fagus*, Aug. 1915. Not rare, in foliaceous woods. Typical specimens are easily distinguished from the preceding species by the following characteristics: Cap at first conic-campanulate, rather acute, then expanded with prominent umbo. Surface at first whitish, smooth (slightly viscid), later on — especially towards the edge — argillaceous and somewhat fibrillose. Stem comparatively short, firm, equal or slightly bulbous, almost glabrous, at last slightly brownish-fibrillose. Gills at first pallid. Flesh almost white, in base of stem and umbo occasionally turning faintly incarnate, as does also the stem when bruised. The descriptions of Saccardo and Bataille do not exactly cover my plant, but I have found no others which will fit it. Probably most mycologists have not separated it from *I. pyriodora*.

[*I. corydalina* Quél. — It is not rare to meet with specimens of *I. albidula* in which the umbo — rarely the whole surface of the cap — is as if stained with glaucous-gray ink. This I believe is *I. corydalina* Quél. (said to smell like *Corydalis cava* (bulb?)).

## 4. *I. scabra* Ricken (nec al.).

Spores somewhat oblique, ovate,  $9 \times 5 \mu$ . Cystidia on edge: a) cylindric-bottleshaped, slightly muriculate, about  $10 \mu$  broad; b) cylindric-clubshaped, about  $7 \mu$  broad.

Fig. specim.: Hollufgaard, moist foliaceous wood, Aug. 1915. Rather rare. This species is also very close to *I. pyriodora*. Its chief distinctions are: Cap obtusely umbonate or gibbous, central part covered with dark umber (or almost bistre) broad, adpressed scales, towards the edge fibrillose-lacerate and somewhat paler. Stem whitish, towards the base somewhat sordid. Gills

at first white, then grayist sordid, emarginate with a decurrent line. Flesh whitish, that of the stem turning slightly dirt-brown, but not flushed with incarnate.

The synonymy of this species is very bewildering. I have selected the name *I. scabra* sensu RICKEN (loc. cit. pag. 108), but omitted the name Müller (or Flora Danica). What *Ag. scaber* Müller really is, nobody is likely ever to find out. — Probably the plant mentioned by MASSEE (Monograph pag. 489) and figured by COOKE (loc. cit. tab. 381) sub nom. *I. Bongardii* is identic. The *I. scabra* of FRIES, MASSEE, QUÉLET and others is without smell, and the *I. scabra* figured by COOKE is very unlike my plant.

### β. INGRATÆ.

#### a. squarrosæ-laceræ.

#### 5. *I. Hystrix* Fr. (forma *minorem* Fr.).

Spores narrowly ovate-lemonshaped,  $10 \times 6 \mu$ . Edge of gills sparingly set with dispersed, fusoid-bottleshaped, slightly muriculate, about  $14 \mu$  broad cystidia, mixed with numerous inflated ovate, about  $12 \mu$  broad ones. The erect cuspidate scales on the cap are formed of agglutinate fibrils.

Fig. specim.: Vaasemose, wood of *Fagus*, Oct. 1915 (a single specimen).

Excellently figured by FRIES (Icones sel. tab. 106<sup>1</sup>), but my plant was smaller and not so dark.

#### 6 a. *I. lacera* Fr.

Spores almost cylindric, long,  $11-15 \times 4\frac{1}{2} \mu$  (or  $11-18 \times 5-5\frac{1}{2}$ ,  $10-13 \times 5\frac{3}{4} \mu$ ). Cystidia (projecting portion) inflated conic, obtuse or somewhat acute, occasionally slightly muriculate, about  $18 \mu$  broad.

Fig. specim.: Bederslev, edge of path in young plantation of *Picea*, July 1898. — Common on sandy ground, especially in plantations of *Picea* etc., but also in the sandhills along the West-coast. — (*I. maritima* is said to have nodulose spores, but seems to be very much like this species).

#### 6 b. *I. lacera* forma *gracilis*.

Spores and cystidia as in the type.

Fig. specim.: Hjallese, in copsewood amongst grass (on rather rich soil), Sept. 1904. Slender like a *Leptonia*, but probably only a somewhat etiolated form.

#### 7. *I. cinnamata* Fr.

Spores obliquely ovate,  $9 \times 5 \mu$ . Cystidia on edge: a) dispersed, projecting, cylindric-elongated fusiform, slightly muriculate;



b) numerous, inflated, roundish. On the face of the gills are numerous cystidia of the former kind. Contents of cystidia brownish.

Fig. specim.: Hjallese, moist foliaceous copsewood, Aug. 1902. Common in similar localities.

In the young plant the upper portion of the stem is (inside and outside) violet-blue. The edge of the gills is brown (from the cystidia), the sides pallid (but not bluish). Figured very well by BRESADOLA (loc. cit. tab. 51<sup>2</sup>). The plant figured by COOKE (l. c. tab. 425), with nodulose spores, does not belong here.

#### 8. *I. obscura* (Pers.).

Spores obliquely ovate (narrower towards apex),  $7\frac{1}{2}$ — $9 \times 4\frac{1}{2}$ — $5 \mu$ . Cystidia brown, inflated, of variable shape.

Fig. specim.: Bederslev Dale, in wood of *Picea*, aggregate, July 1898. — Not rare in similar localities.

This species differs from the preceding one in being larger (cap 2—3 cm) and more robust. The surface is tomentose-squamulose, disc subsquarrose but not set with erect, pointed squamules like *I. cinnamomea*. The flesh is whitish (in apex of stem occasionally slightly flushed with violet) tasteless and with a faint disagreeable smell. The cap is fuscous-umber, never violet. For this and other reasons I formerly referred this plant to *I. dulcamara* forma *aestivalis*, with the description of which (by Fries) it fairly well agrees. But as *Ag. dulcamarus* Alb. & Schw. — whatever that name was originally intended to represent — is now generally used for a plant very different from mine, I follow most modern authors in using the name *I. obscura*.

#### 9. *I. griseo-lilacina* n. sp. (Plate III, fig. 4).

Spores somewhat obliquely ovate-ellipsoid,  $9 \times 5 \mu$ . Cystidia inflated, of variable shape (hyaline).

Fig. specim.: Stensballe near Horsens, growing gregariously on leafmouldy ground in wood of *Fagus*, Aug. 1909. Found several times in similar localities in Fyn (1910—16).

*Pileo 2 cm lato, pallide brunneo, margine griseo-lilacino, primitus tomentoso, dein lacerato-squamuloso, marginem versus fibrilloso et sub-fimbriato. Stipite 4—7 cm  $\times$  3 mm, farcto, intus extusque pallide lilacino, albido-flocculoso-fibrilloso. Lamellis latiusculis, subadnatis vel adfixis, pallide fusco-brunneis (primitus albido-lilacinis), acie alba. Sporae et cystidia ut supr.*

It seems to be closely related to *I. violascens* Quél. The pale lilac colour distinguishes it from no. 10.

#### 10. *I. abjecta* Karst.

Spores ovate,  $8\frac{1}{2}$ — $9\frac{1}{2} \times 4\frac{1}{2} \mu$ . Cystidia bottleshaped-fusoid, 12— $13 \mu$  broad, apex muriculate.

Fig. specim.: Langesø, on black soil, edge of pond in folia-

ceous wood (*Fagus* and *Tilia*), Sept. 1916. — Also found in other localities, in mixed foliaceous woods.

Subfasciculate. Cap 1—2 cm, slightly umbonate, main colour at first hidden by the whitish, fibrillose-subflocculose tomentum, which in the central part soon disappears, thus revealing the brownish colour. Stem somewhat wavy, thin (2—3 mm), 3—4 cm high, inside and outside pallid incarnate-brownish, at first everywhere white-plumulose-fibrillose.

#### 11. *I. flocculosa* (sensu Mass.).

Spores obliquely ovate,  $9 \cdot 9\frac{1}{2} \times 5 \mu$ . Cystidia narrowly fusoid,  $12 \mu$  broad, muriculate; (on the edge also some few obovate-club-shaped ones).

Fig. specim.: Højsholt near Tommerup, wood of *Fagus* and *Quercus*, Sept. 1916.

Cap 2—3 $\frac{1}{2}$  cm, campanulate-convex, then expanded gibbous, of a dull brown colour, at last somewhat lighter (subfulvous), everywhere fibrillose-tomentose-subsquamulose: towards the edge the fibrils are somewhat hoary-gray and at last slightly rimose. Veil well developed, fibrillose. Stem about 5 mm broad. For the rest not much different from no. 10. Vide also no. 21.

#### b. *rimosæ-velutinæ*.

#### 12. *I. pusio* Karst. Plate III, fig. 5.

Spores  $9\frac{1}{2}$ — $10 \times 4\frac{3}{4}$ — $5 \mu$ . Cystidia 13—19  $\mu$  broad, fusoid-bottle-shaped, muriculate.

Fig. specim.: Hollufgaard, wood of *Quercus* and *Corylus*, on moist ground, Sept. 1916.

Corresponds exactly to the description given by KARSTEN. (Kritisk öfversigt af Finlands Basidsvampar, p. 465.) The apex of the stem is very slightly white-flocculose. Well characterized by the brown, subrimose cap and lilac apex of stem. Affined to *I. descissa*.

#### 13 a. *I. geophylla* (Sow.).

Spores obliquely ovate-ellipsoid or ovate,  $8-9 \times 4-6 \mu$ . Cystidia dispersed, fusoid-bottleshaped, rather long, apex muriculate. Apex of stem clad with hyphæ and cystidia of the same shape as those on edge of gills (1916).

Fig. specim.: Hjallesø, foliaceous copsewood, Oct. 1895. — Common in similar localities.

#### 13 b. *I. g.* var. *alba* (= *A. albus* Schw.).

Spores and Cystidia like no. 13 a. — The white — when old somewhat pallid — cap apparently is the only characteristic distinguishing this form from the lilac one. — It is common

— often very numerous — also in coniferous woods, where the lilac form is comparatively rare.

13 c. **I. g. var. lateritia** (Weinm.).

Spores  $7-8 \times 5 \mu$ , somewhat obliquely ovate. Cystidia  $16-20 \mu$  broad, ventricose-bottleshaped, rather obtuse, apex with or without small warty excrescences.

Fig. specim.: Glamsbjerg, gregarious on the ground in wood of *Picea*, Aug. 1900.

When in bud this variety is white like no. 13 b, and some specimens remain so; but most specimens soon become tinged, all over or partly, with a bright tile-red.

14. **I. rubescens** Gill. (= *I. Godeyi* Gill.).

Spores obliquely ovate,  $9-9\frac{1}{2} \times 5 \mu$ . Cystidia broad, inflated, obtuse or ventricose-bottleshaped and muriculate.

Fig. specim.: Lemvig, under shrubs in park, Oct. 1908; gregarious. To be met with occasionally as well in foliaceous as in coniferous woods.

Distinguished from 13 c by the obtusely-umbonate cap, larger size (stem up to 1 cm broad) etc. The smell is faint, spermiatic. Every part of the plant turns more or less incarnate-rubescens when old or bruised.

BRESADOLA (loc. cit.) refers this characteristic species to *Ag. Trinii*, Weinm.; but MASSEE (loc. cit., page 470) conclusively proves this to be an error. All modern authors agree that *I. rubescens* and *I. Godeyi* are synonyms.

15 **I. sindonia** Fr.

Spores obliquely ovate,  $8-10\frac{1}{2} \times 4\frac{1}{2}-5 \mu$ . Cystidia on edge: a) fusoid-bottleshaped, muriculate,  $10-12 \mu$  broad, b) small, ovate-clubshaped,  $25 \times 10 \mu$ .

Fig. specim.: Vaasemose, edge of plantation of *Abies*, Oct. 1913. — Found in diverse localities, always in coniferous woods.

Intermediate between the white *I. geophyila* and no. 16. Microscopically it is absolutely like the latter, and probably it is only a variety of this species.

Cap 3–4 cm, campanulate-convex, soon expanded-umbonate, at first whitish, smooth, then sordidly whitish with a tinge of ochre or pale clay-colour, minutely fibrillose-tomentose, at last somewhat fibrillose-rimose. Stem rather long, slender, smooth, minutely striate, apex powdered, occasionally slightly hollow, whitish, apex at last slightly brownish. Veil apparent but fugacious. Gills free, crowded, at first whitish, then light grayish-brown with a whitish edge.

16. *I. deglubens* Fr.

Spores obliquely ovate,  $9 \times 5 \mu$ . Cystidia on edge: a) bladder-shaped, short,  $10-14 \mu$  broad, b) fusoid, protruding, muriculate.

Fig. specim.: Hesselager (»Skelmose«), in wood of *Abies*, Oct. 1906 — and in several other coniferous woods, generally gregarious.

Cap at first innately fibrillose-tomentose, then more or less cracked-squamulose, dingy brownish, at last darker, almost date-brown. Stem pallid, with a tinge of brownish, apex somewhat white-plumulose or powdered, minutely downy-fibrillose towards the base. — My plant is never »obscure furfurata« on top of stem, and probably comes nearest to KARSTEN's var. *trivialis*.

17. *I. cæsariata* Fr. var.

Spores  $7-8 \times 4\frac{1}{2}-5 \mu$ , ovate or ellipsoid. Cystidia scattered, their protruding part cylindric-bottleshaped, muriculate or not.

Fig. specim.: Hjallesø, on moist ground (*Spiraea Ulmaria* etc.) in foliaceous wood, Aug. 1904. Also found in some other similar localities.

Cap somewhat convex, umbonate, then expanded-umbonate, covered (except about the umbo) with brownish-yellow fibrils, which at last form small fibrillose squamules. Stem at first minutely powdered, then smooth, slightly striate. Gills at first whitish, then dingy brownish with a tinge of yellow. — Perhaps too closely related to *I. hirtella*. — Cooke's figure shows an almost chestnut-brown, scaly fungus, very different from mine.

18. *I. hirtella* Bres.

Spores ovate,  $9\frac{1}{2} \times 5 \mu$ . Cystidia on edge: a) bottleshaped, muriculate, b) inflated, obtuse.

Fig. specim.: Fruens Bøge in grass on roadside in foliaceous wood, Aug. 1907. Also found in other similar localities, especially under *Corylus*.

Cap  $1\frac{1}{4} \times 2$  cm, somewhat conic, at last expanded and slightly umbonate, towards the edge fibrillose and at last slightly rimose, but for the rest set with small fibrillose squamules, central part brownish-yellow, edge paler. Stem minutely striate-sulcate, velvety-pruinose (i. e. clad with cystidia like those on the gills), pallid ochraceous-yellowish. Gills rather distant, adnate, pallid with a tinge of yellow (edge pale), when ripe yellowish-cinnamon. It has a very faint smell (of peach-leaves or bitter almonds).

19. *I. posterula* Britz. ex Sacc. Plate III, fig. 6.

Spores broadly ovate,  $7\frac{1}{2}-8 \times 4\frac{3}{4}-5 \mu$ . Cystidia fusoid, muriculate, about  $10-12 \mu$  broad.

Fig. specim.: Aarup, in wood of *Pinus* and *Picea*, Sept. 1916.

Cap 3—5 cm, at first somewhat campanulate, then expanded,

with small umbo, at first almost smooth, later somewhat fibrillose and slightly rimose, pale ochraceous, umbo subfulvous. Veil evident, fibrillose. Stem without bulb, somewhat clubshaped (base 7—11 mm, apex 5—7 mm), white, apex at last slightly brownish, not pruinose but with white silky fibrils and slightly flocculose above. Gills rather crowded, adfixed, at first whitish then pallid cinnamon with a flush of yellowish.

This species differs from *I. fastigiata* by the fusoid cystidia, from *I. Cookei* by want of bulb and by the muriculate cystidia. — The *I. descissa* of RICKEN (l. cit., p. 104) appears to be identic.

## 20. *I. auricoma* (Batsch).

Spores  $9-9\frac{1}{2} \times 5 \mu$ , obliquely ovate, pale brownish-yellow. Cystidia on edge: a) ovate-clubshaped, b) obtusely bottleshaped, about  $12 \mu$  broad, slightly muriculate.

Fig. specim.: Hjallesø, copsewood (*Corylus*, *Quercus* etc.), Aug. 1915 (and in other similar localities).

Cap  $1\frac{1}{2}$  cm, conic, then expanded and umbonate, at first smooth, then rimose-fibrillose. The young cap is pallid ochraceous, but soon the fibrils become deeper yellowish-ochraceous. Stem subflocculose and somewhat fibrillose (apex slightly pruinose) not distinctly hollow. — The figure in BATSCH: *Elenchus Fungorum* (V 21) does not show the fibrillose-rimose nature of the cuticle.

## 21. *I. pallidipes* Ellis et Everh. Plate III, fig. 7.

Spores somewhat obliquely ellipsoid,  $10-11 \times 5-5\frac{1}{2} \mu$ . Cystidia on edge: a) awlshaped-fusoid (free portion about  $50 \mu$  long), muriculate, b) short, cylindric-obovate.

Fig. specim.: Aarup, on naked ground (roadside) in wood, Sept. 1901. — Also found in some other similar localities.

Cap 2—3 cm, grayish-brown, at first minutely fibrillose-subflocculose (fibrils somewhat interwoven, whitish, silky), then somewhat rimose. Veil well developed. Stem cylindric, white,  $3\frac{1}{2}$ —4 cm. Gills narrowed behind, slightly adnate. Smell faint, spermiatic.

This species is very intimately related to no. 10 and 11, and possibly not specifically distinct. — I formerly referred it to *I. perbrevis* (Weinm.); but as most modern authors use this name for a fulvous or rufous little mushroom without muriculate cystidia (vide COOKE loc. cit. tab. 519, MASSEE, Monograph p. 490 etc.) I have dropped this name. The description of *I. pallidipes* in Massee's monograph (p. 476) fits my plant very well. To judge from the description *I. eutheloides* Peck (another American species) can hardly be specifically distinct.

## 22. *I. descissa* Fr. var.

Spores obliquely ovate,  $8\frac{1}{2}-10 \times 5 \mu$ . Cystidia fusoid-bottleshaped, about  $15 \mu$  broad, muriculate.

Fig. specim.: Hjallesø, copsewood (*Corylus* etc.) Oct. 1898.

This little species, which is rather common in similar localities, differs somewhat from the current description of *I. descissa*. In my plant the stem is not hollow, the gills are adfixed and the fibrils of the distinctly rimose cuticle are rather dark brown.

23. *I. microspora* n. sp. Plate III fig. 8.

Spores  $6\frac{1}{2}$ — $7 \times 4$ — $4\frac{1}{4}$   $\mu$ , obliquely ovate. Cystidia: a) obtusely fusoid-bottleshaped, about 14  $\mu$  broad, muriculate; b) small, obtuse.

Fig. specim.: »Bleget» and »Frueskov» near Egeskov, gregarious in foliaceous wood, Sept. 1916. Also met with in other similar localities.

*Pileo 1,2—1,8 cm, primitus subconico, dein explanato et minute umbonato, pallide fusco-brunneo (centro obscuriore), primitus levigato dein margine fibrilloso-subrimoso; stipite æquali, glabro nec pruinato sed apice leviter flocculoso, 3—4 cm  $\times$   $1\frac{1}{2}$ —3 mm, primitus pallido dein brunneo-pallido, subfistuloso; lamellis pallide fusco-cinnamomeis adnatis; odore nullo.*

Smaller and paler than no. 22. and not distinctly rimose.

## A. DEPAUPERATÆ.

### $\alpha$ . PYRIODORÆ.

24. *I. Bongardii* (Weinm) Fr.

Spores ovato-ellipsoid,  $13 \times 6\frac{1}{2}$   $\mu$ . Cystidia (on edge) crowded, obtusely cylindric-clubshaped, about 10  $\mu$  broad.

Cap 3—5 cm, obtusely umbonate, fibrillose-squamose, scales ochraceous-brown, towards the edge entirely split up into fibrils. Stem rather long, somewhat wavy, fibrillose, apex slightly mealy. Edge of gills white. All parts of the mushroom become flushed with incarnate when bruised or cut.

The large spores and clubshaped cystidia distinguish this species from all other pyriodorous species. The figure of FRIES (Icon. sel. II 107<sup>1-2</sup>) gives a very good idea of the habit of this species. As to the *I. Bongardii* of COOKE and MASSEE vide no. 4.

### $\beta$ . INGRATÆ.

25. *I. calamistrata* Fr.

Spores oblong-oval,  $10\frac{1}{2}$ — $12 \times 5\frac{1}{2}$   $\mu$ . Cystidia inflated clubshaped, 12—18  $\mu$  broad. Fig. specim.: Hjallesø, on naked, clayey ground under *Alnus* and *Fagus*, Sept. 1912.

This is the slender form figured by FRIES (Icones sel. 106<sup>2</sup>). The cap is only about 2 cm, the stem 5 cm  $\times$  3 mm. The base of the stem is clad with a whitish, often somewhat bluish-green tomentum (not so dark as figured by Fries).



26. **I. delecta** Karst. Plate III fig. 9.

Spores oval-phaseoliform,  $7-9\frac{1}{2} \times 5 \mu$ , light brownish yellow. Cystidia cylindric-clubshaped,  $7-11 \mu$  broad. Sporepowder ochraceous-cinnamon.

Fig. specim.: Aarup, grassy border of drive in plantation of *Picea*, (sandy soil) gregarious, Sept. 1916.

Cap  $2\frac{1}{2}-4$  cm convex-plane, at first velvety-tomentose, then velvety squamulose, at first pallid ochraceous-brown, later on becoming vividly ochraceous-fulvous in the middle and honey-coloured-ochraceous towards the edge. Veil evident, arachnoid. Stem somewhat hollow, at first pale then sordidly yellow-brown floccose-fibrillose, rather short, 3–6 mm broad. Gills rather crowded, slightly emarginate with a small decurrent tooth, at first yellowish-white (edge white) then yellowish-brown or cinnamon. Flesh of cap slightly ochraceous, of stem pale dirt-yellow.

KARSTEN cites *I. caesariata* v. *fibrillosa* as a synonym, what the rude figure of FRIES (Icon. sel. tab. 109<sup>3</sup>) makes not unlikely. The plant described by SEV. PETERSEN (loc. cit.) sub nom. *I. flocculosa* Berk. is undoubtedly identical, to judge from the careful description given. — It forms a transition to the *Flammula*-type (of the *velutini*-group) especially *Fl. Agardhii*.

**I. Cookei** Bres.

Spores oval, subphaseoliform,  $7-8 \times 4\frac{1}{4} \mu$ . Cystidia crowded, inflated clubshaped or subglobular,  $16-22 \mu$  broad.

Fig. specim.: Hjallesø, copsewood, Sept. 1898. Not uncommon.

The stem is faintly striate, not powdery-pruinose, apex slightly flocculose-fibrillose. — The bulbous stem (and different cystidia) distinguishes it from *I. posterula*; the smooth spores and not pruinose stem from *I. prætervisa*. — *I. rimosa* (Ricken, nec. al.) seems to me almost identical; and so is *I. confusa* Karst (Kritisk öfversigt of Finlands basidsvampar. Tillägg I. p. 35), only larger and with larger spores. It is very well figured by BRESADOLA (Fungi Trid. tab. 121).

28. **I. squamata** n. sp. Plate III fig. 10.

Spores broadly ovate-ellipsoid,  $9\frac{1}{2}-10 \times 5\frac{1}{2}-6\frac{1}{4} \mu$ . Cystidia crowded, clubshaped,  $11-15 \mu$  broad.

Fig. specim.: Vormark, in grass behind a hedge (planted with *Populus*) on clayey ground, Oct. 1901. — Also, in similar locality, Vaasemose 1904.

*Pileo carnoso, conico-expanso, 3-7 cm lato, subumbonato, fibrilloso et subrimoso, parte centrali in squamis adpressis disrupto, fulvo-lutescente, squamis obscurioribus: Stipite 3-7 cm  $\times$  5-10 mm, aequali solido, prinitus pallide brunneo, dein saturatiore, fibrilloso-striato, intus leviter colorato; lamellis subliberis, prinitus sordide flavo-albidis, dein brunneis cum tinctura fusco-flavis, margine albo. Spore et cyst. ut supr.*

This species is very closely related to *I. fastigiata*, forming a transition from *I. fastigiata* to *I. mimica* Masee (which has larger spores). — *Ag. Curreyi* Berk., which Masee refers to *I. fastigiata*, seems to be intermediate between the typical *I. fastigiata* and *I. squamata* (to judge from Cooke's figure (l. c. tab. 398).

### 29. *I. fastigiata* (Schæff.)

Spores oval-subphaseoliform,  $10-11 \times 5\frac{1}{2} \mu$ . Cystidia cylindric, obtuse, about  $12 \mu$  broad.

Fig. specim.: Hjallese, in wood of *Fagus* and *Corylus*, July 1905. Not uncommon.

The cap in this species varies more or less acute, the stem is fibrillose-subfloccose, (not pruinose). Like most modern authors I use the name *I. fastigiata* for this smooth-spored species, excluding diverse rough-spored ones. — *I. flavella* Karst. as far as I can see only differs in larger spores. Bresadola's figure is somewhat exaggerated, very acute with almost green gills. — *I. fastigiata* var *superba* Fries (Icon. sel. tab. 108) hardly belongs here.

### 30. *I. perlata* Cooke.

Spores ovate, somewhat oblique,  $9\frac{1}{2}-10\frac{1}{2} \times 6\frac{1}{2} \mu$ . Cystidia cylindric-clubshaped,  $11 \mu$  broad.

Fig. specim.: Tommerup, old grassfield behind copsewood, gregarious, July 1914.

Cap  $5-6\frac{1}{2}$  cm, somewhat conical, at last expanded and subumbonate (when moist subviscid), even, very minutely fibrillose, umbo fuscous-brownish, whitish towards the edge, later on becoming fibrillose-subrimose, the fibrils darker. Stem about 8 cm  $\times$  10—12 mm, at first white, somewhat fibrillose (not mealy), then turning brownish inside and outside (from base upward). — My plant is not quite so large as Cooke's figure.

### 31. *I. brunnea* Quél.

Spores  $9-11 \times 5-5\frac{1}{2} \mu$ . Cystidia on edge of gills inflated club-shaped,  $12-15 \mu$  broad.

Fig. specim.: Hjallese, behind a hedge, Sept. 1902. — Rather common in light foliaceous woods, often gregarious.

The more or less bright chestnut-brown colour of the cap distinguishes this species from its allies. The bulbless stem is originally almost white but soon becomes partly flushed with brown.

When in bud the central part of the cap is often partly covered by whitish adpressed scales and fibrils which soon disappear. When this rudimentary universal veil is very apparent we have, I believe, *I. maculata* Boud.

32. *I. jurana* Pat.

Spores broadly obliquely ovate,  $9\frac{1}{2}$ — $10\frac{1}{2} \times 6$ — $6\frac{1}{2}$ . Cystidia clubshaped. Basidia 4-spored.

Fig. specim.: A. Hjallesø, walk in copsewood, Aug. 1915. B. similar locality, Aug. 1909. — Also collected in a wood of Fagus, near Høbbet, Oct. 1916.

Cap at first conical, then expanded, umbonate, everywhere covered by dark violet-fuscous (at last very dark fuscous) fibrils, which in the middle form adpressed scales, while towards the edge the pale bottom-colour is seen between the fibrils. Stem slightly bulbous, apex indistinctly flocculose, fibrillose below, of a dingy violet-incarnate colour. Gills at first whitish-gray, then grayish-brown (edge whitish) slightly adfixed. Flesh (especially about the umbo and the lower part of the stem) vinous lilac-incarnate. Smell faint.

BRESADOLA refers *I. jurana* to what he calls *I. frumentacea* (Bull.), from a figure in BULLIARD's work (Champ. de France 571<sup>1</sup>) which other authors think represents a *Hygrophorus* (or something else). To judge from his own description and figure (loc. cit. tab. 200) his plant is not unlike mine, except for the »frumentaceous« smell which is lacking in my plant.

33. *I. rhodiola* Bres.

Spores obliquely ovate,  $9$ — $10 \times 6 \mu$ . Cystidia clubshaped,  $11$ — $13 \mu$  broad.

Fig. specim.: Egeskov, grassy drive in foliaceous wood, Aug. 1914.

Cap expanded-conical, about 5 cm broad, rather acutely umbonate, bottom-colour pale brownish-ochraceous (umbo subincarnate), everywhere with darker (brownish) very subtile fibrils, at last slightly rimose. Stem 7 cm  $\times$  6 mm, fibrillose-striate, not bulbous, from base upward turning pallid-rosy (inside and outside), as does also the flesh about the umbo. Gills at first grayish, then dull cinnamon, with whitish edge, almost free.

It is perhaps no more than a pale and slender form of the preceding species (and Bresadola himself unites them in vol. II of *Fungi Tridentini*) but their habit is very different.

## II. CLYPEUS.

## A. CALOSPORÆ.

34. *I. calospora* Quél. (= *I. echinospora* Egeland).

Spores broadly oval or subglobular ( $8\frac{1}{2}$ — $10 \times 7$ — $8 \mu$ ), set whit  $1\frac{1}{2}$ — $3 \mu$  long, hardly  $1 \mu$  broad cylindric aculei, sub micr. brown.

Cystidia on edge of gills numerous, about 10—11  $\mu$  broad, often somewhat muriculate.

Fig. specim.: A: Killerup, gregarious in moist wood of *Fagus*, amongst *Juncus bufonius* etc., July 1905. B: Fruens Bøge, drive in foliaceous wood, Aug. 1907.

Cap 1—1 $\frac{1}{2}$  cm, at first conic-convex, then expanded with minute umbo, brown, central part set with minute recurved squamules. Stem even, slender (2—3 cm  $\times$  1 $\frac{1}{4}$  mm), *Naucoria*-like, slightly hollow, especially above with minute white squamules, brown. Gills free, broad (2—3 mm), rather distant and at last rather thick. Flesh of stem brown. — B is a little larger, darker and more densely white-flocculose.

In the diagnosis of *I. calospora* (Fungi Tridentini I) the spores are said to be globose, and for this reason I formerly dared not refer my plant to this species. But authentic specimens from BRESADOLA, which I have had the opportunity to examine, have spores exactly like mine. MASSEE's figure of the spore of *I. calospora* (Monograph, tab. 32 fig. 12) is exaggerated and misleading, showing an enormous globose spore, about 20  $\mu$  diameter, with coarse, about 3  $\mu$  broad papillæ. The spores are really more like his figure of *I. Gaillardii*, only the aculei are shorter and blunter. — These two species appear to be very closely allied. My first find (A) is more like *I. Gaillardii* in size etc.

*I. echinospora* Egeland (Nyt Magazin f. Naturvidenskaberne, Vol. 51<sup>1</sup> 1912) is identical. Also *I. lanuginosa* (sensu Schroet.) seems to belong here.

## B. ASTROSPORINÆ.

### $\alpha$ . MURICULATÆ.

#### 35. *I. asterospora* Quél.

Spores 9—12  $\times$  7 $\frac{1}{2}$ —9  $\mu$ , stellate (with 5—8 strongly prominent obtusely conical projections). Cystidia ventricose-bottleshaped, muriculate. — The velvet pruina on the stem consists of similar cystidia (1916).

Fig. specim.: Hjallese, mixed foliaceous wood, Sept. 1896. — Rather common.

This characteristic species is well distinguished by the strongly rimose, dark brown cap, and the velvety-pruinose, marginately bulbous stem, which soon turns brown all over (except the bulb).

#### 36a. *I. prætervisa* Quél.

Spores 10—12  $\times$  7—9  $\mu$ , somewhat irregularly substellate (with 5—8 coarse, obtuse warts). Cystidia 12—14  $\mu$  broad, fusoid-cylindric, apex muriculate.

Fig. specim.: Hjallese, copsewood, Sept. 1890. — Not uncommon, in foliaceous woods; also met with in wood of *Pinus* (Aarup 1916).

Like *I. asterospora* it has a minutely pruinose, marginately bulbous stem; but the cap is ochraceous, less strongly rimose. Probably *I. subrimosa* Karst. is not specifically distinct; the only notable difference is in the spores, which KARSTEN says are  $13-14 \times 10-11 \mu$ . (Kritisk Öfversigt, Tillägg I p. 36). MASSEE — chiefly on account of the large spores — includes it in *I. asterospora*.

36. **I. p. var. pusilla** J. E. Lange. Plate III fig. 11.

Spores  $10\frac{1}{2} \times 7\frac{1}{4} \mu$ , somewhat irregular, with 7—8 prominent but rather blunt, coarse warts. Cystidia fusoid-bottleshaped,  $60 \times 15 \mu$  (the neck about  $9 \mu$ ), muriculate.

Fig. specim.: Odense Hed., on boggy ground under *Salix cinerea*. Aug. 1916, gregarious. — Also found in other similar localities in Fyn (and in Jylland by Poul Larsen).

Cap 1.2—1.8 cm, at first conic-campanulate, then expanded with a small rather acute umbo, yellowish-brown, minutely fibrillose, then subrimose and slightly darker brownish. Stem 4 cm  $\times$   $1\frac{1}{2}$ —2 mm, pale above, rest yellowish-brownish, minutely striate and everywhere velutino-pruinose. Bulb small, marginate. Gills at first pale, then date-brownish, rather distant, free.

Although this little tiny plant is not half the size of the ordinary *I. prætervisa* (and more like a *Naucoria* than an *Inocybe*) I do not think it deserves to be put up as a distinct species, as all its microscopic and macroscopic characters are almost identic.

37. **I. fibrosa** (Sow.) var. **trivialis**.

Spores very irregular with prominent and pointed base, 9—13  $\mu$  long, with subglobular warts. Cystidia inflated, about 18  $\mu$  broad, apex somewhat muriculate. Basidia occasionally with only 2 or 3 sterigms.

Fig. specim.: Hjallese, clayey ground in garden under *Populus*, Sept. 1902 (and July 1903). — Found in several places in light foliaceous woods, especially under poplars.

Cap fleshy, obtusely conical (3—4 cm broad, 2—3 cm high), central part pallid argillaceous, rest pale dingy brownish. Surface slightly viscid, minutely fibrillose (but not truly rimose), edge often irregular. Stem white, firm (6—10 mm) almost equal (below ground with a slight bulbous swelling), even and almost glabrous. Gills rather crowded, almost free, white then pallid brownish-gray.

An uncommonly large and pale, almost white form of this species I have met with in Jylland (near Langaa 1914); this constitutes the *I. fibrosa* proper (as figured by BRESADOLA l. c. tab. 56). The more trivial form here figured approaches *I. prætervisa*, but differs by the white, almost glabrous stem and want of distinct bulb etc. *I. fastigiata* var. *superba* (Fries: Icon. sel. tab. 108) might be a rather dark, large form of this species.



38. **grammata** Quél. (= *I. hiulca* Bres. nec al.).

Spores  $7\frac{1}{2}$ — $9 \times 5$ — $6 \mu$ , nodulose. Cystidia bottleshaped, 15— $18 \mu$  broad.

Fig. specim.: Stenløse, in wood of *Fagus* and *Corylus*, gregarious, Oct. 1916.

Cap  $2\frac{1}{2}$ —4 cm, convex, with small, rather acute umbo. The umbo is whitish, glabrous. The cuticle of the cap is made up of delicate, silky whitish fibrils (which are densest towards the edge), through which the pale, dingy-incarnate-brownish flesh is seen. Stem tall ( $4$ — $7\frac{1}{2}$  cm), even, everywhere minutely pruinose, inside and outside pallid brownish-incarnate, base whitish and terminating in a subterraneous, white, somewhat marginate bulb. Gills dirt-grayish, narrowed behind, adnate.

*I. hiulca* (Kalkbr.) sensu Bresad. (very well figured in *Fungi Tridentini* tab. 122<sup>2</sup>) is evidently identic; but as *I. hiulca* is a very disputed species, which has been construed to mean almost everything, I think it better to use Quélet's name.

39. **I. napipes** n. sp. Plate III, fig. 12.

Spores  $9$ — $10 \times 6 \mu$ , with 5—6 rather prominent nodules or warts. Cystidia generally muriculate, about  $50$ — $60 \times 12$ — $18 \mu$ .

Fig. specim.: Knagelbjerg Skov near Faaborg, on boggy ground under *Betula* and *Pinus*, Nov. 1907. (Also found at Ryslunge in moist foliaceous wood, Aug. 1908, and near Hobro, in boggy wood.

*Pileo* 3—5 cm, *ex conico-campanulato expanso et acute umbonato*, obscure brunneo vel umbrino, *primilis sublevis*, minute fibrilloso, dein fibroso-rimoso; *Stipite* elato, bulbosus (bulbus subdepressus nec marginatus) brunneo, sursum pallescens, leviter striato, minute fibrilloso (nec pruinato); *lamellis subconfertis*, angustis, subliberis, *ex albido-griseis brunneis* *Sporæ et cyst. ut supr.*

*I. carpta* Bres. (nec al.) differs in bulbless stem etc.

40. **I. umboninota** Peck var. Plate III, fig. 13.

Spores  $9\frac{1}{2}$ — $11 \times 6 \mu$ , conic-ellipsoid, with 5—7 obtuse warts. Cystidia about  $15 \mu$  broad, prominent portion obtusely conic-cylindric, apex slightly muriculate or smooth.

Fig. specim.: Roldskovene (near Skørping), roadside in mixed wood, on mossy ground, Sept. 1900.

Cap  $1\frac{1}{2}$ — $2\frac{1}{2}$  cm, convex, with a very prominent, rather acute, conical umbo, chestnut-brown, fibroso-rimose. Stem short, base slightly swelled, glabrous, glossy, slightly striate, chestnut-brown. Gills ventricose, broad, adfixed, becoming cinnamon-chestnut. Flesh of cap white, of stem chestnut-brownish.

My plant is smaller than Peck's and has somewhat larger spores.

41. *I. umbrina* Bres.

Spores  $8-9 \times 5-6 \mu$ , nodulose-angulate, with more or less prominent obtuse nodules. Cystidia fusiform-bottleshaped, about  $14 \mu$  broad, apex somewhat muriculate.

Fig. specim.: Vaasemose, wood of *Fagus*, Oct. 1915. — Also found in wood of *Picea* (very numerous), Gerup, Oct. 1916 [and in Jylland (P. Larsen), and Sjølland (Sev. Petersen)].

Cap 1,8—2,5 cm, convex, slightly umbonate, innately fibrillose, subviscid. Stem not hollow, minutely fibrillose-striate, apex slightly powdered, bulbous (bulb occasionally marginate, subterranean). Gills at first claycoloured-brownish, narrowed behind and somewhat adnate. Veil evident but fugacious. The whole plant is at first pale brownish but soon turns darker brown (except the white bulb).

Differs from BRESADOLA's description and figure (*Fungi Trid.* tab. 55) by being somewhat smaller, the gills not yellowish at first. — *I. Rennyi* Berk. et Br. (Cooke's illustr. tab. 520 A) looks very much like my plant, but has no bulb.

42. *I. plumosa* Qué. (nec Bolt.) (?).

Spores  $9\frac{1}{2}-12 \mu$  long, oblong, nodulose-warty, somewhat oblique. Cystidia dispersed, variable, ventricose, muriculate,  $15-20 \mu$  broad.

Fig. specim.: Vormark, sandy and stony common on the coast of Store Belt, under poplars, Oct. 1901.

Cap rather fleshy,  $6\frac{1}{2}$  cm, gibbous, edge at last turned upwards: central part almost even, but for the rest fibrillose-subsquamous (not rimose), brown (colour of *Tricholoma imbricatum*). Stem equal, rather short, 1 cm broad, slightly fibrillose, paler than cap. Gills crowded, at first dingy white, then pallid grayish-brown, adnate. Flesh white. Not hygrophane but somewhat paler when dry.

As I have only found this species once (some few, rather overgrown specimens) I cannot decide whether it is the true *I. plumosa* of Quélet. It has much in common with *I. carpta* Bres. (nec al.) (*Fungi Trid.* tab. 54), (which QUÉLET cites as a synonym to his *I. plumosa*), but is not so dark and without the acute umbo.

43. *I. lanuginella* Schroet.

Spores  $8-9\frac{1}{2} \mu$ , oblong, outline with about 5 obtuse nodules. Cystidia inflated fusoid,  $15-16 \mu$  broad, smooth or somewhat muriculate. Fibrils on cap septate, about  $7 \mu$  broad.

(Spores oblong, irregularly nodulose (with 7—8 obtuse nodules) (1900).

Fig. specim.: Killerup, on moist ground (*Juncus bufonius* etc.) in foliaceous wood, July 1905. — Also found at Arden, under *Salices* in garden (1900), and at Lammehave 1905.



Cap  $1\frac{1}{2}$ —3 cm, at first conic-convex, then plane-convex with small umbo, grayish-brown, at last dingy ochraceous brown, tomentose-fibrillose-subsquamulose. Veil evident, arachnoid. Stem pallid, base dingy brownish, minutely silky-fibrillose, rather short. Gills rather crowded, at first pallid then grayish-brown.

My plant is somewhat larger than described by SCHROETER (Die Pilze Schlesiens I, p. 577). Possibly it is not specifically distinct from *I. curvipes* Karst. Also *I. cicatricata* Ellis et Everh. appears to be almost identic. Habitually it has much in common with the smoothspored *I. pallidipes* (no. 21).

#### 44. *I. putilla* Bres.

Spores  $8\frac{1}{2}$ — $9\frac{1}{2}$   $\times$   $6$ — $6\frac{1}{2}$   $\mu$ , obtusely nodulose (outline with 5—6 nodules). Cystidia fusoid-bottleshaped, about 15  $\mu$  broad, muriculate.

Fig. specim.: Hjallesø, on the ground in copsewood (*Corylus*), solitary, Aug. 1915.

Cap 1,2 cm, acutely conic, minutely fibrillose, at last slightly rimose. Stem whitish, flushed with dingy incarnate (especially downward), bulbless. Edge of gills minutely crenulate. — Smaller than described by Bresadola. It has much in common with no. 43.

#### 45. *I. rufoalba* Pat. et Doass. Plate III, fig. 14.

Spores irregularly ovate, outline with about 6 obtuse nodules, 7—8  $\mu$  long. Cystidia: a) bottleshaped, muriculate, b) obovate.

Fig. specim.: Aarup, sandy road in plantation of *Picea*, gregarious, Sept. 1910.

Cap 1—2 cm, at first conic-convex, then expanded, more or less gibbous, when young brownish, everywhere whitish-tomentoso-pilose, later on darker (subferruginous, umbo darker brown), tomentoso-squamulose. Margin without veil. Stem outside and inside somewhat ferruginous, short ( $2\frac{1}{2}$ —3 cm  $\times$   $1\frac{1}{2}$ —3 mm), often wavy, not bulbous, at last slightly hollow, apex with white powder, rest slightly fibrillose-flocculose. Gills broad, rather distant, ventricose, narrowly adfixed or almost free, at first argillaceous-brownish, then ochraceous-rusty brown. — Generally subfasciculate.

A very distinct little species, well characterized by the white, pilose tomentum.

#### 46. *I. petiginosa* Fr.

Spores  $6\frac{1}{2}$ —7  $\times$   $4\frac{1}{2}$   $\mu$ , outline broadly ellipsoid, irregularly wavy-nodulose. Cystidia crowded, free portion elongated-conic, about 10  $\mu$  broad, muriculate. — The stem is densely set with similar cystidia (1910).

Fig. specim.: Hjallesø in moist copsewood (*Fagus* etc.), Sept. 1898. — Common, especially on and around old rotten stumps of *Fagus*.

This elegant little species (easily recognized by the brownish, everywhere minutely pruinose stem, white agglutinate squamules and pale yellowish gills) was in later years transferred to *Hebeloma* by Fries — SCHROETER (loc. cit.) describes it very well sub. nom. *Astr. scabella* (Fr.).

### β. DEPAUPERATÆ.

#### 47. 1. *lanuginosa* (Bull.).

Spores  $10 \times 7 \mu$ , outline with about 7 obtuse, but prominent warts. Cystidia obtuse,  $16-20 \mu$  broad, inflated, generally broadest below middle.

Fig. specim.: Ryslinge, on moist ground in wood of *Fagus*, amongst ferns, Oct. 1908. — Also found at Lykkesholm (1909), on old stump of *Fagus*, and in a bog under *Salices* and *Picea*, Langesø, Oct. 1909. a o. localities.

Some authors distinguish between two species: a xylophilous one: *I. lanuginosa* Bres. and a terrestrial one: *I. sabuletorum* (B. et Curt.). Like MASSEE (l. cit., pag 468) I see no real difference between the two. — *I. lanuginosa* sensu Schroet. vide no. 34. — Possibly some of the forms described by SEV. PETERSEN under *I. relicina* belong here. — The plant is well characterized by the umber-brown, velutino-squamulose cap, the central part of which has minute, erect squamules, while the stem has brown, floccose squamules. — (What *I. relicina* really is, I do not know. QUÉLET, MASSEE and others describe it as a small, smoothspored fungus, while SCHROETER's description depicts a gigantic *I. lanuginosa*). — *Clypeus squarrosulus* Karst (Symbol ad Myc. Fennic. XXXII) seems to me exactly like *I. lanuginosa*.

## BIBLIOGRAPHY.

Besides the works mentioned in part I and II, the following books and papers have been used:

AD. Q. BATSCH: *Elenchus Fungorum*. Halle, 1783—89.

FR. BATAILLE: *Flore analytique des Inocybes d'Europe*. Besançon 1910.

P. BULLIARD: *Histoire des Champignons de la France*. Paris 1791—1812.

P. A. KARSTEN: *Kritisk Öfversigt af Finlands Basidsvampar; Tillägg I* (Helsingfors 1891.).

G. MASSEE: *A Monograph of the Genus Inocybe*. *Annals of Botany* XVIII, London 1904.

STURM: *Deutschlands Flora: Pilze*, bearb. von Dittmann u. a. Nürnberg 1817.

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